STATE OF KUWAIT
Directorate General of Civil Aviation

دولة الكويت
الإدارة العامة للطيران المدني

Date : 2023/07/24 التـــاريخ :

Ref : 2023/114/SUPDT-R/41 الإشارة :

All KCASR Stakeholders and Users

Sub.: ***Regulatory Circular No. 2023-07.***
Revision Number 4 to Kuwait Civil Aviation Safety Regulations – KCASR 1 – PERSONNEL LICENSINGPART FCL – ACCEPTABLE MEANS OF COMPLIANCE (AMC) & GUIDANCE MATERIALS (GM).

Dear Sir,

Please find enclosed herewith the regulatory circular No. ***2023-07*** regarding the issuance of ***KCASR 1 – PERSONNEL LICENSINGPART FCL – ACCEPTABLE MEANS OF COMPLIANCE (AMC) & GUIDANCE MATERIALS (GM) Rev. 4***. This is for your information and distribution to all concerned departments.

Up to date KCASR Parts are published on the DGCA/ASD website (https://kcasr.dgca.gov.kw).

If required, the DGCA/Aviation Safety Department personnel are available to answer your questions on the interpretation and intended implementation of the proposed amendments.

KCASR 1 – PERSONNEL LICENSINGPART FCL – ACCEPTABLE MEANS OF COMPLIANCE (AMC) & GUIDANCE MATERIALS (GM) Rev. 4 will be in effect from 27/Aug/2023.

Yours Sincerely,

President of Civil Aviation.

Engr. Emad F. Al-Jelwi
Deputy Director General for Aviation Safety
Air Security & Transport Civil Aviation
Assistant Undersecretary

CC: Director General of Civil Aviation.
Dy. Dir. Gen. Kuwait. Intel. Airport Affairs.
Dy. Dir. Gen. for Air Navigation Services Affairs.
Safety Management Coordination Center (SMCC).
Head of Technical Office.
Civil Aviation Security Department.
Aviation Safety Director.
Air Transport Director.
Inspection & oversight Superintendent.
Head of Standards & Aviation Safety Regulations Division.

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www.dgca.gov.kw
E-mail: info@dgca.gov.kw

ص.ب : ١٧ الصفاة - الرمز البريدي ١٣٠٠١ دولة الكويت - البدالة ٢٤٣٣٦٦٩٩ (٩٦٥+) - الرد الآلي : ١٦١ (٩٦٥+) - الفاكس : ٢٤٧١٣٥٠٤ (٩٦٥+)
P.O. Box 17 Safat - P. Code 13001 - State of Kuwait - Operator : (+965) 24336699 - IVR : (+965) 161 - Fax : (+965) 24713504

HRA

STATE OF KUWAIT
Directorate General of Civil Aviation

دولة الكويت
الإدارة العامة للطيران المدني

Date : 2023/07/24 التـــاريخ :

Ref : 2023/113/SUPDT-R/41 الإشارة :

REGULATORY CIRCULAR (NO. 2023-07)

Subject:

Notice of Amendment to Kuwait Civil Aviation Safety Regulations KCASR (issue 4).

Purpose:

The purpose of this Regulatory Circular No. **2023-07** is to Amend **KCASR 1 – PERSONNEL LICENSINGPART FCL – ACCEPTABLE MEANS OF COMPLIANCE (AMC) & GUIDANCE MATERIALS (GM** (issue 4) .

This Regulatory Circular No.**2023-07** is based on (NPA) No. 2023-07 dated on 01/Jun/2023

Revisions:

This amendment will be included in revision (**04**) of KCASR 1 – PERSONNEL LICENSINGPART FCL – ACCEPTABLE MEANS OF COMPLIANCE (AMC) & GUIDANCE MATERIALS (GM.

Regulatory Requirements:

This amendment shall apply to the following Organizations approved by the Directorate General of Civil Aviation (DGCA) or authorized to operate within the State of Kuwait:

1. Airport Operators;
2. Air Navigation Service Providers;
3. Air Operator Certificate (AOC);
4. Approved Maintenance Organizations (AMO) Holders;
5. Ground Handling Service Providers;
6. Flying Training Organizations;
7. All users of KCASRs.

Effective Date:

This new revision will be in effect from **27/Aug/2023**.

Required Action:

All users of KCASR are required to comply with the provisions contained within this amendment from the effective date.

President of Civil Aviation
Engr. Emad F. Al-Jelwi
Deputy Director General for Aviation Safety
Air Security & Transport Civil Aviation
Assistant Undersecretary

www.dgca.gov.kw
E-mail: info@dgca.gov.kw

Rev. 04

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P.O. Box 17 Safat - P. Code 13001 - State of Kuwait - Operator : (+965) 24336699 - IVR : (+965) 161 - Fax : (+965) 24713504

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الطيران المدني
Civil Aviation
State of Kuwait - دولة الكويت

Kuwait Civil Aviation Safety Regulations

KCASR 1 - PERSONNEL LICENSING

PART FCL – ACCEPTABLE MEANS OF COMPLIANCE (AMC) & GUIDANCE MATERIALS (GM)

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(c) After successful completion of the training, the ATO should provide a training completion certificate to the applicant, which describes the evaluation of the factors listed under (a) above and the training received, and includes a statement that the traiing has been successfully completed. The training completion certificate should be presented to the examiner prior to the proficiency check. Following the successful renewal of the rating, the training completion certificate and examiner report form should be submitted to Kuwait DGCA..... 280

Taking into account the factors listed in (a) above, an ATO may also decide that the applicant already possesses the required level of proficiency and that no refresher training is necessary. In such a case, the certificate or other documental evidence referred to in point (c) above should contain a respective statement including sufficient reasoning. 280

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Amendment Record

Amendment No	Date of Issue	Remarks
1	June 2018	Part Rename
2	July 2019	NPA 2019-14 (Renewal Requirements)
3	August 2020	NPA 2020-01 (In Synch with EASA)
4	July 2023	NPA 2023-07 (In Synch with EASA)

Control of this Document

DC.1 Introduction

DC.1.1 Pursuant to Law No (30) of the year 1960 and subsequent Ministerial Decisions No (3) of the year 1986, No (18) of the year 1990, and No (3) of the year 1996, based upon that Law and as reflected in the Preamble to the Kuwait Civil Aviation Safety Regulations, Issue 4, Rev.2, August 2019, the President of the Kuwait Directorate General of Civil Aviation is empowered to adopt and amend Kuwait Civil Aviation Safety Regulations. In accordance herewith, the following AMC & GM is hereby established for compliance by all persons concerned. This AMC & GM shall be known as KCASR 1 Part FCL Acceptable Means of Compliance (AMC) & Guidance Material (GM) and any reference to this title shall mean referring to these regulations governing the requirements to be met for the certification of personnel licensing.

DC.2 Authority for this Regulation

DC.2.1 This KCASR 1 Part FCL Acceptable Means of Compliance (AMC) & Guidance Material (GM) is issued on the authority of the President of the Kuwait Directorate General of Civil Aviation.

DC.3 Applicability

DC.3.1 This KCASR 1 Part FCL Acceptable Means of Compliance (AMC) & Guidance Material (GM) is applicable to the aviation industry of the State of Kuwait.

DC.4 Scope

DC.4.1 KCASR 1 Personnel Licensing (AMC & GM) contains the acceptable means of compliance and guidance material for the personnel licensing regulations and shows compliance with ICAO Annex 1. The AMC & GM are separated into the following parts with cross references between parts where applicable.

- Part ARA Authority Requirements for Aircrew (AMC & GM)
- Part ORA Organisational Requirements for Aircrew (AMC & GM)
- **Part FCL Flight Crew Licensing (AMC & GM)**
- Part CC Cabin Crew (AMC & GM)
- Part FOO/FD Flight Operation Officer and Flight Dispatcher (AMC & GM)
- Part MED Medical (AMC & GM)
- Part 66 Aircraft Maintenance Engineer Licence (AMC & GM)
- Part 147 Approved Training Organisations (AMC & GM)

DC.5 Definitions

DC.5.1 Terms not defined shall have the meaning given to them in the relevant legal instruments or international legal instruments in which they appear, especially as they appear in the Convention and its Annexes.

KCASR 1 Part FCL Acceptable Means of Compliance (AMC) & Guidance Material (GM)

Subpart A - General Requirements

GM1 FCL.005 Scope

Interpretative material

Whenever licences, ratings, approvals or certificates are mentioned in Part-FCL, these are meant to be valid licences, ratings, approvals or certificates issued in accordance with KCASR 1 Personnel Licensing Regulations. In all other cases, these documents are specified.

Whenever 'or' is used as an inclusive 'or', it should be understood in the sense of 'and/or'.

GM1 FCL.010 Definitions

Abbreviations

The following abbreviations apply to the Acceptable Means of Compliance and Guidance Material to Part-FCL:

A	Aeroplane
AC	Alternating Current
ACAS	Airborne Collision Avoidance System
ADF	Automatic Direction Finding
ADS	Aeronautical Design Standard
AFCS	Automatic Flight Control System
AFM	Aircraft Flight Manual
AGL	Above Ground Level
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information regulation and control
AIS	Aeronautical Information Services
AMC	Acceptable Means of Compliance
AeMC	Aero-medical Centre
AME	Aero-medical Examiner
AoA	Angle of Attack
AOM	Aircraft Operating ManualAPU Auxiliary Power Unit
As	Airship
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
ATO	Approved Training Organisation

ATP	Airline Transport Pilot
ATPL	Airline Transport Pilot Licence
ATS	Air Traffic Service
AUM	All Up Mass
AUPRTA	Airplane Upset Prevention and Recovery Training Aid
B	Balloon
BCAR	British Civil Airworthiness Requirement
BEM	Basic Empty Mass
BITD	Basic Instrument Training Device
BPL	Balloon Pilot Licence
CAS	Calibrated Air Speed
CAT	Clear Air Turbulence
CB-IR	Competency-based training course for instrument rating
CDI	Course Deviation Indicator
CFI	Chief Flying Instructor
CG	Centre of Gravity
CGI	Chief Ground Instructor
CP	Co-pilot
CPL	Commercial Pilot Licence
CRE	Class Rating Examiner
CRI	Class Rating Instructor
CRM	Crew Resource Management
CS	Certification Specification
CQB	Central Question Bank
CTKI	Chief Theoretical Knowledge Instructor
DC	Direct CurrentDF Direction Finding
DME	Distance Measuring Equipment
DPATO	Defined Point After Take-off
DPBL	Defined Point Before Landing
DR	Dead Reckoning navigation
DTO	Declared Training Organisation
ECQB	European Central Question Bank
EFIS	Electronic Flight Instrument System

EIR	En route instrument rating
EOL	Engine Off Landings
ERPM	Engine Revolution Per Minute
ETA	Estimated Time of Arrival
ETOPS	Extended-range Twin-engine Operation Performance Standard
FAF	Final Approach Fix
FAR	Federal Aviation Regulations
FCL	Flight Crew Licensing
FE	Flight Examiner
F/E	Flight Engineer
FEM	Flight Examiner Manual
FFS	Full Flight Simulator
FI	Flight Instructor
FIE	Flight Instructor Examiner
FIS	Flight Information Service
FMC	Flight Management Computer
FMS	Flight Management System
FNPT	Flight and Navigation Procedures Trainer
FS	Flight Simulator
FSTD	Flight Simulation Training Device
ft	feet
FTD	Flight Training Device
G	Gravity forces
GLONASS	Global Orbiting Navigation Satellite System
GM	Guidance Material
GNSS	Global Navigation Satellite Systems
GPS	Global Positioning System
H	Helicopter
HF	High Frequency
HOFCS	High Order Flight Control System
HPA	High Performance Aeroplane
hrs	Hours
HUMS	Health and Usage Monitoring System

HT	Head of Training
IAS	Indicated Air Speed
ICAO	International Civil Aviation Organisation
IGE	In Ground Effect
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IR	Instrument Rating
IRE	Instrument Rating Examiner
IRI	Instrument Rating Instructor
ISA	International Standard Atmosphere
JAR	Joint Aviation Requirements
kg	Kilogram
LAPL	Light Aircraft Pilot Licence
LDP	Landing Decision Point
LMT	Local Mean Time
LIFUS	Line Flying Under Supervision
LO	Learning Objectives
LOFT	Line Orientated Flight Training
m	Meter
MCC	Multi-Crew Cooperation
MCCI	Multi-Crew Cooperation Instructor
ME	Multi-engine
MEL	Minimum Equipment List
MEP	Multi-engine Piston
MET	Multi-engine Turboprop
METAR	Meteorological Aerodrome Report
MI	Mountain Rating Instructor
MP	Multi-pilot
MPA	Multi-pilot Aeroplane
MPL	Multi-crew Pilot Licence
MPH	Multi-pilot Helicopter
MTOM	Maximum Take-off Mass
NDB	Non-directional Beacon
NM	Nautical Miles

NOTAM	Notice To Airmen
NOTAR	No Tail Rotor
OAT	Outside Air Temperature
OBS	Omni Bearing Selector
OEI	One Engine Inoperative
OEM	Original Equipment Manufacturer
OGE	Out of Ground Effect
OML	Operational Multi-pilot Limitation
OSL	Operational Safety Pilot Limitation
OTD	Other Training Devices
PAPI	Precision Approach Path Indicator
PBN	Performance-based Navigation
PF	Pilot Flying
PIC	Pilot-In-Command
PICUS	Pilot-In-Command Under Supervision
PL	Powered-lift
PNF	Pilot Not Flying
PPL	Private Pilot Licence
QDM	Magnetic heading
QFE	Atmospheric pressure at aerodrome elevation
QNH	Altimeter sub-scale setting to obtain elevation when on the ground
RNAV	Radio Navigation
RPM	Revolution Per Minute
RRPM	Rotor Revolution Per Minute
R/T	Radiotelephony
S	Sailplane
SATCOM	Satellite communication
SE	Single-engine
SEP	Single-engine Piston
SET	Single-engine Turboprop
SFE	Synthetic Flight Examiner
SFI	Synthetic Flight Instructor
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Weather

SLPC	Single Lever Power Control
SOP	Standard Operating Procedure
SP	Single-pilot
SPA	Single-pilot Aeroplane
SPH	Single-pilot Helicopter
SPIC	Student PIC
SPL	Sailplane Pilot Licence
SSR	Secondary Surveillance Radar
STI	Synthetic Training Instructor
TAF	(Terminal Area Forecasts) Aerodrome Forecast
TAS	True Air Speed
TAWS	Terrain Awareness Warning System
TCH	Type Certificate Holder
TDP	Take-off Decision Point
TEM	Threat and Error Management
TK	Theoretical knowledge
TMG	Touring Motor Glider
TORA	Take-off Run Available
TODA	Take-off Distance Available
TR	Type Rating
TRE	Type Rating Examiner
TRI	Type Rating Instructor
UPRT	Upset Prevention and Recovery Training
UTC	Coordinated Universal Time
V	Velocity
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOR	VHF Omni-directional Radio Range
ZFTT	Zero Flight Time Training
ZFM	Zero Fuel Mass

GM2 FCL.010 Definitions – lateral and vertical navigation

Lateral and vertical navigation guidance refers to the guidance provided either by:

(a) a ground-based radio navigation aid; or
(b) computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of these.

GM3 FCL.010 Definitions

UPSET PREVENTION AND RECOVERY TRAINING (UPRT) DEFINITIONS

In the context of UPRT, the following abbreviations apply to the Acceptable Means of Compliance and Guidance Material to Part-FCL:

'Advanced UPRT' refers to the advanced UPRT course in accordance with point FCL.745.A.

'Aeroplane upset' refers to an undesired aircraft state characterised by unintentional divergences from parameters normally experienced during operations. An aeroplane upset may involve pitch and/or bank angle divergences as well as inappropriate airspeeds for the conditions.

'Angle of Attack (AoA)' refers to the angle between the oncoming air, or relative wind, and a defined reference line on the aeroplane or wing.

'Approach-to-stall' refers to flight conditions bordered by the stall warning and stall.

'Basic UPRT' refers to the UPRT elements and exercises integrated into training courses for the issue of a CPL, MPL or Phases 1 to 3 of the integrated ATP course.

'Developed upset' refers to a condition meeting the definition of an aeroplane upset.

'Developing upset' refers to any time the aeroplane begins to unintentionally diverge from the intended flight path or airspeed.

'Energy state' refers to how much of each kind of energy (kinetic, potential or chemical) the aeroplane has available at any given time.

'First indication of a stall' refers to the initial aural, tactile or visual sign of a stall event which can be either naturally or synthetically induced.

'Flight crew resilience' refers to the ability of a flight crew member to recognise, absorb and adapt to disruptions.

'Fidelity level' refers to the level of realism assigned to each of the defined FSTD features.

'Flight path' refers to the trajectory or path of the aeroplane travelling through the air over a given space of time.

'Flight path management' refers to active manipulation, using either the aeroplane's automation or manual handling, to command the aeroplane's flight controls in order to direct the aeroplane along a desired trajectory.

'FSTD validation envelope' refers to the envelope consisting of the following three subdivisions:

(a) Flight test validated region
This is the region of the flight envelope which has been validated with flight test data, typically by comparing the performance of the FSTD against the flight test data through tests incorporated in the qualification test guide (QTG) and other flight test data utilised to further extend the model beyond the minimum requirements. Within this region, there is high confidence that the simulator responds similarly to the aircraft. Note that this region is not strictly limited to what has been tested in the QTG; as long as the

aerodynamics mathematical model has been conformed to the flight test results, that portion of the mathematical model can be considered to be within the flight test validated region.

(b) Wind tunnel and/or analytical region

This is the region of the flight envelope for which the FSTD has not been compared to flight test data, but for which there has been wind tunnel testing or the use of other reliable predictive methods (typically by the aircraft manufacturer) to define the aerodynamic model. Any extensions to the aerodynamic model that have been evaluated in accordance with the definition of an exemplar stall model (as described in the stall manoeuvre evaluation section) must be clearly indicated. Within this region, there is moderate confidence that the simulator will respond similarly to the aircraft.

(c) Extrapolated region

This is the region extrapolated beyond the flight test validated and wind tunnel/analytical regions. The extrapolation may be a linear extrapolation, a holding of the last value before the extrapolation began, or some other set of values. Whether this extrapolated data is provided by the aircraft or simulator manufacturer, it is a 'best guess' only. Within this region, there is low confidence that the simulator will respond similarly to the aircraft. Brief excursions into this region may still retain a moderate confidence level in FSTD fidelity; however, the instructor should be aware that the FSTD's response may deviate from that of the actual aircraft.

'Load factor' refers to the ratio of a specified load to the weight of the aeroplane, the former being expressed in terms of aerodynamic forces, propulsive forces or ground reactions.

'Loss of Control In-flight (LOC-I)' refers to a categorisation of an accident or incident resulting from a deviation from the intended flight path.

'Manoeuvre-based training' refers to training that focuses on a single event or manoeuvre in isolation.

'Negative training' refers to training which unintentionally introduces incorrect information or invalid concepts, which could actually decrease rather than increase safety.

'Negative transfer of training' refers to the application (and 'transfer') of what was learned in a training environment (i.e. a classroom, an FSTD) to normal practice, i.e. it describes the degree to which what was learned in training is applied to actual, normal practices. In this context, negative transfer of training refers to the inappropriate generalisation of knowledge and skills to a situation or setting in normal practice that does not equal the training situation or setting.

'Original Equipment Manufacturer (OEM)' refers to the original equipment manufacturer of an aircraft or associated parts or equipment or of parts or equipment installed on the basis of a supplemental type certificate (STC).

'Post-stall regime' refers to flight conditions at an AoA greater than the critical AoA.

'Scenario-based training' refers to training that incorporates manoeuvres into real-world experiences to cultivate practical flying skills in an operational environment.

'Stall' refers to loss of lift caused by exceeding the aeroplane's critical AoA.

Note: A stalled condition can exist at any attitude and airspeed, and may be recognised by continuous stall warning activation accompanied by at least one of the following:

(a) buffeting, which could be heavy at times;
(b) lack of pitch authority and/or roll control; and
(c) inability to arrest the descent rate.

Note: It is possible that in certain conditions the stall warning may not be activated.

'Stall event' refers to an occurrence whereby the aeroplane experiences conditions associated with an approach-to-stall or a stall.

'Stall (event) recovery procedure' refers to the manufacturer-approved aeroplane-specific stall recovery procedures, such as those contained in the flight crew operations manual (FCOM). If an OEM-approved recovery procedure does not exist, the aeroplane-specific stall recovery procedure developed by the ATO, based on the stall recovery template, may be used.

'Stall warning' refers to a natural or synthetic indication provided when approaching a stall that may include one or more of the following indications:

(a) aerodynamic buffeting (some aeroplanes will buffet more than others);
(b) reduced roll stability and aileron effectiveness;
(c) visual or aural cues and warnings;
(d) reduced elevator (pitch) authority;
(e) inability to maintain altitude or arrest rate of descent; and
(f) stick shaker activation (if installed).

Note: A stall warning indicates an immediate need to reduce the AoA.

'Startle' refers to the initial, short-term, involuntary physiological and cognitive reactions to an unexpected event that commence the normal human stress response.

'Stick pusher' refers to any device that automatically applies a nose-down movement and pitch force to an aeroplane's control columns to attempt to decrease the aeroplane's AoA. Device activation may occur before or after aerodynamic stall, depending on the aeroplane type.

Note: A stick pusher is not installed on all aeroplane types.

'Stick shaker' refers to a device that automatically vibrates the control column to warn the pilot of an approaching stall.

Note: A stick shaker is not installed on all aeroplane types.

'Stress (response)' refers to the response to a threatening event that includes physiological, psychological and cognitive effects. These effects may range from positive to negative and can either enhance or decrease performance.

'Surprise' refers to the emotionally based recognition of a difference in what was expected and what is actual.

'Train-to-proficiency' refers to approved training designed to achieve end-state performance objectives, providing sufficient assurances that the trained individual is capable of consistently carrying out specific tasks safely and effectively.

Note: In the context of this definition, 'train-to-proficiency' can be replaced by 'training-to-proficiency'.

'Type-specific UPRT' refers to UPRT elements and exercises integrated into training courses for the issue of a class or type rating pursuant to Part-FCL or during recurrent or refresher training for a specific aeroplane class or type.

'Undesired aircraft state' refers to flight-crew-induced aircraft position or speed deviation, misapplication of controls, or incorrect systems configuration, associated with a reduction in margins of safety.

Note (1): Undesired states can be managed effectively, restoring margins of safety, or flight crew response(s) can induce an additional error, incident or accident.

Note (2): All countermeasures are necessary flight crew actions. However, some countermeasures to threats, errors and undesired aircraft states that flight crew employ are built upon 'hard'/systemic-based resources provided by the aviation system.

'Unsafe situation' refers to a situation which has led to an unacceptable reduction in safety margin.

'Unusual attitude' refers to an aircraft in flight intentionally exceeding the parameters normally experienced in line operations or training, as applicable.

'Incipient spin' refers to a transient flight condition in the post-stall regime where an initial, uncommanded roll in excess of 45° has resulted from yaw asymmetry during a stall and which, if recovery action is not taken, will lead rapidly to a developing spin. Prompt recovery during this incipient spin stage will normally result in an overall heading change, from pre-stall conditions, of not more than 180°.

'Developing spin' refers to a flight condition in the post-stall regime where the aeroplane exhibits abnormal, but varying, rates of yaw and roll, together with changing pitch attitude, following an incipient spin but before the establishment of a developed spin. A developing spin follows an unrecovered incipient spin and will usually persist, in the absence of any recovery action, until a developed spin ensues.

'Developed spin' refers to a flight condition in the post-stall regime where the aeroplane has achieved approximately constant pitch attitude, yaw rate and roll rate on a descending flight path. In transition from a stall with significant, persistent yaw, with no recovery action, to attaining a developed spin, the aeroplane is likely to have rolled through at least 540°.

'FSTD training envelope' refers to the high and moderate confidence regions of the FSTD validation envelope.

GM4 FCL.010 Definitions

DEFINITIONS IN GM3 FCL.010 RELATED TO THE POST-STALL REGIME

The definitions for 'incipient spin', developing spin' and 'developed spin' in GM3 FCL.010 relate to the post-stall regime in aeroplanes that might typically be used in the context of the advanced UPRT in accordance with point FCL.745.A. The definitions are not intended for application to commercial air transport operations.

AMC1 FCL.015 Application and issue of licences, ratings and certificates

Application and report forms

Common application and report forms can be found:

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

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

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

d) For renewals:

Part FCL licence holder should apply to Kuwait DGCA through an (AOC, POC holders or a certified Flying Club), as applicable, providing both English language proficiency and the medical certificate are valid.

AMC1 FCL.025 Theoretical knowledge examinations for the issue of licences

Terminology

The meaning of the following terms used in FCL.025 should be as follows:

(a) 'Entire set of examinations': an examination in all subjects required by the licence level.

(b) 'Examination': the demonstration of knowledge in one or more examination papers.

(c) 'Examination paper': a set of questions to be answered by a candidate for examination.

(d) 'Attempt': a try to pass a specific paper.

(e) 'Sitting': a period of time established by the Kuwait DGCA within which a candidate can take an examination. This period should not exceed 10 consecutive days. Only one attempt at each examination paper is allowed in one sitting.

AMC1 FCL.025(a)(2) Theoretical knowledge examinations for the issue of licences and ratings

COMPLETION OF THE AREA 100 KSA ASSESSMENT BEFORE FINAL EXAMINATION

Before being recommended by an ATO to sit the final examination paper at the first attempt, an applicant for a professional licence should have successfully completed the applicable Area 100 KSA summative assessments and mental maths test at the ATO.

AMC1 FCL.050 Recording of flight time

General

(a) The record of the flights flown should contain at least the following information:

(1) personal details: name(s) and address of the pilot;

(2) for each flight:

(i) name(s) of PIC;

(ii) date of flight;

(iii) place and time of departure and arrival;

(iv) type, including make, model and variant, and registration of the aircraft;

(v) indication if the aircraft is SE or ME, if applicable;

(vi) total time of flight;

(vii) accumulated total time of flight.

(3) for each FSTD session, if applicable:

(i) type and qualification number of the training device;

(ii) FSTD instruction;

(iii) date;

(iv) total time of session;

(v) accumulated total time.

(4) details on pilot function, namely PIC, including solo, SPIC and PICUS time, co-pilot, dual, FI or FE;

(5) Operational conditions, namely if the operation takes place at night, or is conducted under instrument flight rules.

(b) Logging of time:

(1) PIC flight time:

(i) the holder of a licence may log as PIC time all of the flight time during which he or she is the PIC;

(ii) the applicant for or the holder of a pilot licence may log as PIC time all solo flight time, flight time as SPIC and flight time under supervision provided that such SPIC time and flight time under supervision are countersigned by the instructor;

(iii) the holder of an instructor certificate may log as PIC all flight time during which he or she acts as an instructor in an aircraft;

(iv) the holder of an examiner's certificate may log as PIC all flight time during which he or she occupies a pilot's seat and acts as an examiner in an aircraft;

(v) a co-pilot acting as PICUS on an aircraft on which more than one pilot is required under the type certification of the aircraft or as required by operational requirements provided that such PICUS time is countersigned by the PIC;

(vi) if the holder of a licence 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 30 minutes, such series of flights may be recorded as a single entry.

(2) co-pilot flight time: the holder of a pilot licence occupying a pilot seat as co-pilot may log all flight time as co-pilot flight time on an aircraft on which more than one pilot is required under the type certification of the aircraft, or the regulations under which the flight is conducted;

(3) cruise relief co-pilot flight time: a cruise relief co-pilot may log all flight time as co-pilot when occupying a pilot's seat;

(4) instruction time: a summary of all time logged by an applicant for a licence or rating as flight instruction, instrument flight instruction, instrument ground time, etc., may be logged if certified by the appropriately rated or authorised instructor from whom it was received;

(5) PICUS flight time: provided that the method of supervision is acceptable to the Kuwait DGCA, a co-pilot may log as PIC flight time flown as PICUS when all

the duties and functions of PIC on that flight were carried out in such a way that the intervention of the PIC in the interest of safety was not required.

(c) Format of the record:

(1) details of flights flown under commercial air transport may be recorded in a computerised format maintained by the operator. In this case an operator should make the records of all flights operated by the pilot, including differences and familiarisation training, available upon request to the flight crew member concerned.

(2) for other types of flight on the aeroplane, helicopter and powered lift category, the pilot should record the details of the flights flown in the following logbook format. When a computerised format is used all items of the following logbook format should be contained.

(3) For sailplanes, balloons and airships, a suitable format should be used that contains the relevant items mentioned in (a) and additional information specific to the type of operation.

PILOT LOGBOOK

Holder's name(s) _____

Holder's licence number _____

HOLDER'S ADDRESS:	
	[space for address change]
[space for address change]	*[space for address change]*
[space for address change]	*[space for address change]*

1	2		3		4		5				6		7	8	
DATE dd/mm/yy)	DEPARTURE		ARRIVAL		AIRCRAFT		SINGLE-PILOT TIME		MULTI-PILOT TIME		TOTAL TIME OF FLIGHT		NAME(S) PIC	LANDINGS	
	PLACE	*TIME*	*PLACE*	*TIME*	*MAKE, MODEL, VARIANT*	*REGISTRATION*	*SE*	*ME*						*DAY*	*NIGHT*
						TOTAL THIS PAGE									
						TOTAL FROM PREVIOUS									
						TOTAL TIME									

9				10								11				12
OPERATIONAL CONDITION TIME				PILOT FUNCTION TIME								FSTD SESSION				REMARKS AND ENDORSEMENTS
NIGHT		*IFR*		*PIC*		*CO-PILOT*		*DUAL*		*NSTRUCTOR*		*DATE (dd/mm/ yy)*	*TYPE*	*TOTAL TIME OF SESSION*		
																I certify that the entries in this log are true.
																PILOT'S SIGNATURE

Instructions for use

FCL.050 requires holders of a pilot licence to record details of all flights flown. 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 aeroplanes and helicopters or other aircraft categories are recommended to maintain separate logbooks for each aircraft category.

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

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 30 minutes, such series of flights may be recorded as a single entry.

Flight time is recorded:

(1) for aeroplanes, touring motor gliders and powered-lift aircraft, from the moment an aircraft first moves to taking off until the moment it finally comes to rest at the end of the flight;

(2) for helicopters, from the moment a helicopter's rotor blades start turning until the moment the helicopter finally comes to rest at the end of the flight, and the rotor blades are stopped;

(3) for airships, from the moment an airship is released from the mast to taking off until the moment the airship finally comes to rest at the end of the flight, and is secured on the mast;

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 PIC, according to operational requirements, who may delegate the conduct of the flight to another suitably qualified pilot. All flying carried out as PIC is entered in the logbook as 'PIC'. A pilot flying as 'PICUS' or 'SPIC' enters flying time as 'PIC' but all such entries are to be certified by the PIC or FI in the 'Remarks' column of the logbook.

Notes on recording of flight time:

(1) column 1: enter the date (dd/mm/yy) on which the flight commences;

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

(3) column 5: indicate whether the operation was SP or MP, and for SP operation whether SE or ME;

Example:

1	2		3		4		5				6		7	8	
DATE (dd/mm/yy)	DEPARTURE		ARRIVAL		AIRCRAFT		SINGLE PILOT TIME		MULTI-PILOT TIME		TOTAL TIME OF FLIGHT		NAME(S) PIC	LANDINGS	
	PLACE	*TIME*	*PLACE*	*TIME*	*MAKE, MODEL, VARIANT*	*REGISTRATION*	*SE*	*ME*						*DAY*	*NIGHT*
08/04/12	LFAC	1025	EGBJ	1240	PA34-250	9K-		□			2	15	SELF	1	
09/04/12	EGBJ	1810	EGBJ	1930	C152	9K-	□				1	20	SELF		2
11/04/12	LGW	1645	LAX	0225	B747-400	9K-			9	40	9	40	NAME(S) PIC		1

(4) column 6: total time of flight may be entered in hours and minutes or decimal notation as desired;

(5) column 7: enter the name(s) of PIC or SELF as appropriate;

(6) column 8: indicate the number of landings as pilot flying by day or night;

(7) column 9: enter flight time undertaken at night or under instrument flight rules if applicable;

(8) column 10: pilot function time:

(i) enter flight time as PIC, SPIC and PICUS as PIC;

(vii) all time recorded as SPIC or PICUS is countersigned by the aircraft PIC/FI in the 'remarks' (column 12);

(viii) instructor time should be recorded as appropriate and also entered as PIC.

(9) column 11: FSTD:

(i) for any FSTD enter the type of aircraft and qualification number of the device. For other flight training devices enter either FNPT I or FNPT II as appropriate;

(ii) total time of session includes all exercises carried out in the device, including pre- and after-flight checks;

(iii) enter the type of exercise performed in the 'remarks' (column 12), for example operator proficiency check, revalidation.

(10) column 12: the 'remarks' column may be used to record details of the flight at the holder's discretion. The following entries, however, should always be made:

(i) instrument flight time undertaken as part of the training for a licence or rating;

(ix) details of all skill tests and proficiency checks;

(x) signature of PIC if the pilot is recording flight time as SPIC or PICUS; (iv) signature of instructor if flight is part of an SEP or TMG class rating revalidation.

When each page is completed, accumulated flight time or hours should be entered in the appropriate columns and certified by the pilot in the 'remarks' column.

Example:

9				**10**								**11**				**12**
OPERATIONAL CONDITION TIME				PILOT FUNCTION TIME								FSTD SESSION				REMARKS AND ENDORSEMENTS
NIGHT		*IFR*		*PIC*		*CO-PILOT*		*DUAL*		*INSTRUCTOR*		*DATE (dd/mm/yy)*	*TYPE*	*TOTAL TIME OF SESSION*		
		2	15	2	15											
1	20			1	20					1	20					Night rating training
												10/04/12	B747-400 (Q1234)	4	10	Revalidation proficiency check
8	10	9	40	9	40											PIC(US): signature of NAME(S) PIC

AMC1 FCL.055 Language proficiency

General

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

The assessment should determine the applicant's ability to:

(1) communicate effectively using standard R/T phraseology;

(2) deliver and understand messages in plain language in both usual and unusual situations that necessitate departure from standard R/T phraseology.

Note: 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.

Assessment

The assessment may be subdivided into three elements, as follows:

(1) listening: assessment of comprehension;

(2) speaking: assessment of pronunciation, fluency, structure and vocabulary;

(3) interaction.

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

Where appropriate, some or all of these elements may be achieved through the use of the R/T testing arrangements.

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

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.

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

The Kuwait DGCA should establish an appeal procedure for applicants.

The holder of a licence should receive a statement containing the level and validity of the language endorsements.

Where the assessment method for the English language established by the Kuwait DGCA is equivalent to that established for the assessment of use of the English language in accordance with AMC3 FCL.055, the same assessment may be used for both purposes.

Basic assessment requirements

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 R/T communications.

(1) The assessment should determine the ability of the applicant to use both:

(i) standard R/T phraseology;

(ii) plain language, in situations when standardised phraseology cannot serve an intended transmission.

(2) The assessment should include:

(i) voice-only or face-to-face situations;

(ii) common, concrete and work-related topics for pilots.

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

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

(5) The assessment should determine the language skills of the applicant in the following areas:

(i) pronunciation:

(A) the extent to which the pronunciation, stress, rhythm and intonation are influenced by the applicant's first language or national variations;

(B) how much they interfere with ease of understanding.

(ii) structure:

(A) the ability of the applicant to use both basic and complex grammatical structures;

(B) the extent to which the applicant's errors interfere with the meaning.

(iii) vocabulary:

(A) the range and accuracy of the vocabulary used;

(B) the ability of the applicant to paraphrase successfully when lacking vocabulary.

(iv) fluency:

(A) tempo;

(C) hesitancy;

(D) rehearsed versus spontaneous speech;

(E) use of discourse markers and connectors.

(v) comprehension:

(A) on common, concrete and work-related topics;

(B) 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.

(vi) interactions:

(A) quality of response (immediate, appropriate, and informative);

(F) the ability to initiate and maintain exchanges:

(a) on common, concrete and work-related topics;

(b) when dealing with an unexpected turn of events.

(G) 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 AMC2 FCL.055.

(6) 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 or controller communication).

Assessors

It is essential that the persons responsible for language proficiency assessment ('assessors') are suitably trained and qualified. They should be either aviation specialists (for example 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.

(1) The assessors should be trained on the specific requirements of the assessment.

(2) The assessors should not test applicants to whom they have given language training.

Criteria for the acceptability of language assessment bodies

To ensure an impartial assessment process, the language assessment should be independent of the language training.

(1) To be accepted, the language assessment bodies should demonstrate:

(i) appropriate management and staffing;

(ii) quality system established and maintained to ensure compliance with, and adequacy of, assessment requirements, standards and procedures.

(2) The quality system established by a language assessment body should address the following:

(i) management;

(ii) policy and strategy;

(iii) processes;

(iv) the relevant provisions of ICAO or Part-FCL, standards and assessment procedures;

(v) organisational structure;

(vi) responsibility for the development, establishment and management of the quality system;

(vii) documentation;

(viii) quality assurance programme;

(ix) human resources and training (initial and recurrent);

(x) assessment requirements;

(xi) customer satisfaction.

(3) The assessment documentation and records should be kept for a period of time determined by the Kuwait DGCA.

(4) The assessment documentation should include at least the following:

(i) assessment objectives;

(ii) assessment layout, time scale, technologies used, assessment samples, voice samples;

(iii) assessment criteria and standards (at least for the levels 4, 5 and 6 of the rating scale mentioned in AMC2 FCL.055);

(iv) documentation demonstrating the assessment validity, relevance and reliability;

(v) assessment procedures and responsibilities:

(A) preparation of individual assessment;

(B) administration: location(s), identity check and invigilation, assessment discipline, confidentiality or security;

(C) reporting and documentation provided to the Kuwait DGCA or to the applicant, including sample certificate;

(D) retention of documents and records.

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

AMC2 FCL.055 Language proficiency

Rating scale

The following table describes the different levels of language proficiency:

LEVEL	PRONUNCIATION Assumes a dialect or accent intelligible to the aeronautical community	STRUCTURE Relevant grammatical structures and sentence patterns are determined by language functions appropriate to the task	VOCABULARY	FLUENCY	COMPREHENSION	INTERACTIONS
Expert (Level 6)	Pronunciation, stress, rhythm, and intonation, though possibly influenced by the first language or regional variation, almost never interfere with ease of understanding.	Both basic and complex grammatical structures and sentence patterns are consistently well controlled.	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.	Able to speak at length with a natural, effortless flow. Varies speech flow for stylistic effect, for example to emphasise a point. Uses appropriate discourse markers and connectors spontaneously.	Comprehension is consistently accurate in nearly all contexts and includes comprehension of linguistic and cultural subtleties.	Interacts with ease in nearly all situations. Is sensitive to verbal and non-verbal cues, and responds to them appropriately.
Extended (Level 5)	Pronunciation, stress, rhythm, and intonation, though influenced by the first language or regional variation, rarely interfere with ease of understanding.	Basic grammatical structures and sentence patterns are consistently well controlled. Complex structures are attempted but with errors which sometimes interfere with meaning.	Vocabulary range and accuracy are sufficient to communicate effectively on common, concrete, and work-related topics. Paraphrases consistently and successfully. Vocabulary is sometimes idiomatic.	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 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 range of speech varieties (dialect or accent) or registers.	Responses are immediate, appropriate, and informative. Manages the speaker or listener relationship effectively.

Operational (Level 4)	Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation but only sometimes interfere with ease of understanding.	Basic grammatical structures and sentence patterns are used creatively and are usually well controlled. Errors may occur, particularly in unusual or unexpected circumstances, but rarely interfere with meaning.	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.	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 prevent effective communication. Can make limited use of discourse markers and connectors. Fillers are not distracting.	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.	Responses are usually immediate, appropriate, and informative. Initiates and maintains exchanges even when dealing with an unexpected turn of events. Deals adequately with apparent misunderstandings by checking, confirming, or clarifying.
Pre-Operational (Level 3)	Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation and frequently interfere with ease of understanding.	Basic grammatical structures and sentence patterns associated with predictable situations are not always well controlled. Errors frequently interfere with meaning.	Vocabulary 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.	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 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.	Responses are sometimes immediate, 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 of events.

Elementary (Level 2)	Pronunciation, stress, rhythm, and intonation are heavily influenced by the first language or regional variation and usually interfere with ease of understanding.	Shows only limited control of few simple memorised grammatical structures and sentence patterns.	Limited vocabulary range consisting only of isolated words and memorised phrases.	Can produce very short, isolated, memorised utterances with frequent pausing and a distracting use of fillers to search for expressions and articulate less familiar words.	Comprehension is limited to isolated, memorised phrases when they are carefully and slowly articulated.	Response time is slow, and often inappropriate. Interaction is limited to simple routine exchanges.
Pre-Elementary (Level 1)	Performs at a level below the elementary level.	Performs at a level below the elementary level.	Performs at a level below the elementary level.	Performs at a level below the elementary level.	Performs at a level below the elementary level.	Performs at a level below the elementary level.

Note: operational Level (Level 4) is the minimum required proficiency level for R/T 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.

AMC3 FCL.055 Language proficiency

Specific requirements for holders of an IR use of English language

(a) The requirement of FCL.055(d) includes the ability to use the English language for the following purposes:

(1) Flight: R/T relevant to all phases of flight, including emergency situations.

(2) ground: all information relevant to the accomplishment of a flight:

(i) be able to read and demonstrate an understanding of technical manuals written in English, for example an operations manual, a helicopter flight manual, etc.;

(ii) pre-flight planning, weather information collection, NOTAMs, ATC flight plan, etc.;

(iii) use of all aeronautical en-route, departure and approach charts and associated documents written in English.

(3) communication: be able to communicate with other crew members in English during all phases of flight, including flight preparation.

(b) Alternatively, the items in (a) above may be demonstrated:

(1) by having passed a specific examination given by the Kuwait DGCA after having undertaken a course of training enabling the applicant to meet all the objectives listed in (a) above; or

(2) the item in (a)(1) above is considered to be fulfilled, if the applicant has passed an IR, MPL or ATPL skill test and proficiency check during which the two-way R/T communication is performed in English;

(3) the item in (a)(2) above is considered to be fulfilled if the applicant has graduated from an IR, MPL or ATP course given in English or if he or she has passed the theoretical IR or ATPL examination in English;

(4) the item in (a)(3) above is considered to be fulfilled, if the applicant for or the holder of an IR has graduated from an MCC course given in English and is holding a certificate of satisfactory completion of that course or if the applicant has passed a MP skill test and proficiency check for the issue of a class or type rating during which the two-way R/T communication and the communication with other crew members are performed in English.

(c) Where the examination methods referred to above are equivalent to those established for the language proficiency requirements in accordance with AMC1 FCL.055, the examination may be used to issue a language proficiency endorsement.

AMC1 FCL.060(b)(1) Recent experience

When a pilot needs to carry out one or more flights with an instructor or an examiner to comply with the requirement of FCL.060(b)(1) before the pilot can carry passengers, the instructor or examiner on board those flights will not be considered as a passenger.

GM1 FCL.060(b)(1) Recent experience

Aeroplanes, helicopters, powered-lift, airships and sailplanes

If a pilot or a PIC is operating under the supervision of an instructor to comply with the required three take-offs, approaches and landings, no passengers may be on board.

AMC1 FCL.060(b)(5) Recent experience

Non-complex helicopters

Grouping of non-complex helicopters with similar handling and operational characteristics:

(a) Group 1: Bell 206/206L, Bell 407;

(b) Group 2: Hughes 369, MD 500N, MD 520N, MD 600;

(c) Group 3: SA 341/342, EC 120;

(d) Group 4: SA 313/318, SA 315/316/319, AS 350, EC 130;

(e) Group 5: all types listed in AMC1 FCL.740.H (a)(3) and R 22 and R 44.

Subpart B - Light Aircraft Pilot Licence - LAPL

AMC1 FCL.115(c) LAPL – Training course

CHANGE OF TRAINING ORGANISATION

In cases where the applicant completes the training course (theoretical knowledge instruction or flight instruction) at a different DTO or ATO ('completing training organisation') from the one where they have started the training course ('starting training organisation'), the applicant should request from the starting training organisation a copy of the records kept in accordance with point DTO.GEN.220 or point ORA.ATO.120.

AMC1 FCL.115; FCL.120

Syllabus of theoretical knowledge for the LAPL

(a) The training and examination should cover aspects related to non-technical skills in an integrated manner, taking into account the particular risks associated with the licence and the activity. The theoretical knowledge instruction provided by the ATO should include a certain element of formal classroom work but may also include other methods of delivery for example interactive video, slide or tape presentation, computer-based training and other media distance learning courses. The training organisation responsible for the training has to check if all the appropriate elements of the training course of theoretical knowledge instruction have been completed to a satisfactory standard before recommending the applicant for the examination.

(b) The following tables contain the syllabi for the courses of theoretical knowledge, as well as for the theoretical knowledge examinations for the LAPL(B) and LAPL(S). The syllabi for the theoretical knowledge instruction and examination for the PPL(A) and PPL(H) in AMC1 FCL.210 and FCL.215 should be used for the LAPL(A) and the LAPL(H), respectively.

I. Common Subjects

For LAPL(S) and LAPL(B)

1.	**AIR LAW AND ATC PROCEDURES**
1.1.	International law: conventions, agreements and organisations
1.2.	Airworthiness of aircraft
1.3.	Aircraft nationality and registration marks
1.4.	Personnel licensing
1.5.	Rules of the air
1.6.	Procedures for air navigation: aircraft operations
1.7.	Air traffic regulations: airspace structure
1.8.	ATS and air traffic management
1.9.	AIS
1.10.	Aerodromes, external take-off sites
1.11.	Search and rescue
1.12.	Security
1.13.	Accident reporting
1.14.	National law
2.	**HUMAN PERFORMANCE**

2.1.	Human factors: basic concepts
2.2.	Basic aviation physiology and health maintenance
2.3.	Basic aviation psychology
3.	**METEOROLOGY**
3.1.	The atmosphere
3.2.	Wind
3.3.	Thermodynamics
3.4.	Clouds and fog
3.5.	Precipitation
3.6.	Air masses and fronts
3.7	Pressure systems
3.8.	Climatology
3.9.	Flight hazards
3.10.	Meteorological information
4.	**COMMUNICATIONS**
4.1.	VFR communications
4.2.	Definitions
4.3.	General operating procedures
4.4.	Relevant weather information terms (VFR)
4.5.	Action required to be taken in case of communication failure
4.6.	Distress and urgency procedures
4.7.	General principles of VHF propagation and allocation of frequencies

II. Additional subjects for each category

A. Sailplanes

5.	**PRINCIPLES OF FLIGHT – SAILPLANE**
5.1.	Aerodynamics (airflow)
5.2.	Flight mechanics
5.3.	Stability
5.4.	Control
5.5.	Limitations (load factor and manoeuvres)
5.6.	Stalling and spinning
6.	**OPERATIONAL PROCEDURES – SAILPLANE**
6.1.	General requirements
6.2.	Launch methods
6.3.	Soaring techniques
6.4.	Circuits and landing
6.5.	Outlanding
6.6.	Special operational procedures and hazards
6.7.	Emergency procedures
7.	**FLIGHT PERFORMANCE AND PLANNING - SAILPLANE**
7.1.	Verifying mass and balance
7.2.	Speed polar of sailplanes or cruising speed
7.3.	Flight planning and task setting
7.4.	ICAO flight plan (ATS flight plan)
7.5.	Flight monitoring and in-flight re-planning
8.	**AIRCRAFT GENERAL KNOWLEDGE, AIRFRAME AND SYSTEMS AND EMERGENCY EQUIPMENT – SAILPLANE**
8.1.	Airframe

8.2.	System design, loads and stresses
8.3.	Landing gear, wheels, tyres and brakes
8.4.	Mass and balance
8.5.	Flight controls
8.6.	Instruments
8.7.	Manuals and documents
8.8.	Airworthiness and maintenance
9.	**NAVIGATION – SAILPLANE**
9.1.	Basics of navigation
9.2.	Magnetism and compasses
9.3.	Charts
9.4.	Dead reckoning navigation
9.5.	In-flight navigation
9.6.	Global navigation satellite systems

B. Balloons

5.	**PRINCIPLES OF FLIGHT – BALLOON**
5.1.	Principles of flight
5.2.	Aerostatics
5.3.	Loading limitations
5.4.	Operational limitations
6.	**OPERATIONAL PROCEDURES – BALLOON**
6.1.	General requirements
6.2.	Special operational procedures and hazards (general aspects)
6.3.	Emergency procedures
7.	**FLIGHT PERFORMANCE AND PLANNING – BALLOON**
7.1.	Mass
7.1.1.	Purpose of mass considerations
7.1.2.	Loading
7.2.	Performance
7.2.1.	Performance: general
7.3.	Flight planning and flight monitoring
7.3.1.	Flight planning: general
7.3.2.	Fuel planning
7.3.3.	Pre-flight preparation
7.3.4.	ICAO flight plan (ATS flight plan)
7.3.5.	Flight monitoring and in-flight re-planning
8.	**AIRCRAFT GENERAL KNOWLEDGE, ENVELOPE AND SYSTEMS AND EMERGENCY EQUIPMENT – BALLOON**
8.1.	System design, loads, stresses and maintenance
8.2.	Envelope
8.3.	Burner (hot-air balloon and hot-air airship)
8.4.	Fuel cylinders (hot-air balloon or hot-air airship)
8.5.	Basket or gondola
8.6.	Lifting gas (gas balloon)
8.7.	Burning gas (hot-air balloon or hot-air airship)
8.8.	Ballast (gas balloon)
8.9.	Engine (hot-air airship only)

8.10.	Instruments
8.11.	Emergency equipment
9.	**NAVIGATION – BALLOON**
9.1.	General navigation
9.2.	Basics of navigation
9.3.	Magnetism and compasses
9.4.	Charts
9.5.	Dead reckoning navigation
9.6.	In-flight navigation
9.7.	GNSS

AMC1 FCL.120; FCL.125

Theoretical knowledge examination and skill test for the LAPL

(a) Theoretical knowledge examination

(1) The examinations should be in written form and should comprise a total of 120 multiple-choice questions covering all the subjects.

(2) For the subject 'communication' practical classroom testing may be conducted.

(3) The Kuwait DGCA should inform applicants of the language(s) in which the examinations will be conducted.

(b) Skill test

Further training may be required following any failed skill test or part thereof. There should be no limit to the number of skill tests that may be attempted.

(c) Conduct of the test

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

(2) Any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skill requires a complete retest.

(3) An applicant should be required to fly the aircraft from a position where the PIC functions can be performed and to carry out the test as if there is no other crew member. Responsibility for the flight should be allocated in accordance with national regulations.

AMC1 FCL.125 LAPL Skill test

Contents of the skill test for the issue of a LAPL(A)

(a) The route to be flown for the skill test should be chosen by the FE. The route should end at the aerodrome of departure or at another aerodrome. The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board. The navigation section of the test should have a duration of at least 30 minutes which allows the pilot to demonstrate his/her ability to complete a route with at

least two identified waypoints and may, as agreed between applicant and FE, be flown as a separate test.

(b) An applicant should indicate to the FE the checks and duties carried out, including the identification of radio facilities. Checks should be completed in accordance with the flight manual or the authorised checklist for the aeroplane or TMG on which the test is being taken. During pre-flight preparation for the test the applicant should be required to determine power settings and speeds. Performance data for take-off, approach and landing should be calculated by the applicant in compliance with the operations manual or flight manual for the aeroplane or TMG used.

Flight test tolerance

(c) The applicant should demonstrate the ability to:

(1) operate the aeroplane or TMG within its limitations;

(2) complete all manoeuvres with smoothness and accuracy;

(3) exercise good judgment and airmanship;

(4) apply aeronautical knowledge;

(5) maintain control of the aeroplane or TMG at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

(d) The following limits are for general guidance. The FE should make allowance for turbulent conditions and the handling qualities and performance of the aeroplane or TMG used:

(1) height:

(i) normal flight ± 150 ft

(2) speed:

(i) take-off and approach +15/-5 knots

(ii) all other flight regimes ± 15 knots

Content of the skill test

(e) The skill test contents and sections set out in this AMC should be used for the skill test for the issue of a LAPL(A):

SECTION 1 PRE-FLIGHT OPERATIONS AND DEPARTURE	
Use of checklist, airmanship, control of aeroplane or TMG by external visual reference, anti/de-icing procedures, etc. apply in all sections.	
a	Pre-flight documentation, NOTAM and weather briefing
b	Mass and balance and performance calculation
c	Aeroplane or TMG inspection and servicing
d	Engine starting and after starting procedures
e	Taxiing and aerodrome procedures, pre-take-off procedures
f	Take-off and after take-off checks

g	Aerodrome departure procedures
h	ATC liaison: compliance
SECTION 2 GENERAL AIRWORK	
a	ATC liaison
b	Straight and level flight, with speed changes
c	Climbing: i. best rate of climb; ii. climbing turns; iii. levelling off.
d	Medium (30° bank) turns, look-out procedures and collision avoidance
e	Steep (45 ° bank) turns
f	Flight at critically low air speed with and without flaps
g	Stalling: i. clean stall and recover with power; ii. approach to stall descending turn with bank angle 20 °, approach configuration; iii. approach to stall in landing configuration.
h	Descending: i. with and without power; ii. descending turns (steep gliding turns); iii. levelling off.
SECTION 3 EN-ROUTE PROCEDURES	
a	Flight plan, dead reckoning and map reading
b	Maintenance of altitude, heading and speed
c	Orientation, airspace structure, timing and revision of ETAs, log keeping
d	Diversion to alternate aerodrome (planning and implementation)
e	Flight management (checks, fuel systems, carburettor icing, etc.)
f	ATC liaison: compliance
SECTION 4 APPROACH AND LANDING PROCEDURES	
a	Aerodrome arrival procedures
b	Collision avoidance (look-out procedures)
c	Precision landing (short field landing) and crosswind, if suitable conditions available
d	Flapless landing (if applicable)
e	Approach to landing with idle power
f	Touch and go
g	Go-around from low height
h	ATC liaison
i	Actions after flight

SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES	
This section may be combined with Sections 1 through 4	
a	Simulated engine failure after take-off
b	* Simulated forced landing
c	* Simulated precautionary landing
d	Simulated emergencies
e	Oral questions

* These items may be combined, at the discretion of the FE.

AMC2 FCL.125 LAPL Skill test

Contents of the skill test for the issue of a LAPL(H)

(a) The area and route to be flown for the skill test should be chosen by the FE. The route should end at the aerodrome of departure or at another aerodrome. The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board. The navigation section of the test should consist of at least two legs, each leg of a minimum duration of 10 minutes. The skill test may be conducted in two flights.

(b) An applicant should indicate to the FE the checks and duties carried out, including the identification of radio facilities. Checks should be completed in accordance with the flight manual or the authorised checklist or pilot operating handbook for the helicopter on which the test is being taken. During pre-flight preparation for the test the applicant should be required to determine power settings and speeds. Performance data for take- off, approach and landing should be calculated by the applicant in compliance with the operations manual or flight manual for the helicopter used.

Flight test tolerance

(c) The applicant should demonstrate the ability to:

(1) operate the helicopter within its limitations;

(2) complete all manoeuvres with smoothness and accuracy;

(3) exercise good judgment and airmanship;

(4) apply aeronautical knowledge;

(5) maintain control of the helicopter at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

(d) The following limits are for general guidance. The FE should make allowance for turbulent conditions and the handling qualities and performance of the helicopter used:

(1) height:

(i) normal forward flight ± 150 ft

(ii) with simulated major emergency ± 200 ft

(iii) hovering IGE flight ± 2 ft

(2) speed:

(i) take-off approach +15 knots /-10 knots

(ii) all other flight regimes ± 15 knots

(3) round drift:

(i) take-off hover IGE ± 3 ft

(ii) landing no sideways or backwards movement

Content of the skill test

(e) The skill test contents and sections set out in this AMC should be used for the skill test for the issue of a LAPL(H):

SECTION 1 PRE-FLIGHT OR POST-FLIGHT CHECKS AND PROCEDURES	
Use of checklist, airmanship, control of helicopter by external visual reference, anti/de-icing procedures, etc. apply in all sections.	
a	Helicopter knowledge (for example technical log, fuel, mass and balance, performance), flight planning, NOTAM, and weather briefing
b	Pre-flight inspection or action, location of parts and purpose
c	Cockpit inspection, starting procedure
d	Communication and navigation equipment checks, selecting and setting frequencies
e	Pre-take-off procedure and ATC liaison
f	Parking, shutdown and post-flight procedure
SECTION 2 HOVER MANOEUVRES, ADVANCED HANDLING AND CONFINED AREAS	
a	Take-off and landing (lift off and touch down)
b	Taxi and hover taxi
c	Stationary hover with head, cross and tail wind
d	Stationary hover turns, 360 ° left and right (spot turns)
e	Forward, sideways and backwards hover manoeuvring
f	Simulated engine failure from the hover
g	Quick stops into and downwind
h	Sloping ground or unprepared sites landings and take-offs
i	Take-offs (various profiles)
j	Crosswind and downwind take-off (if practicable)
k	Take-off at maximum take-off mass (actual or simulated)
l	Approaches (various profiles)
m	Limited power take-off and landing

n	Autorotations (FE to select two items from the following: basic, range, low speed, and 360 ° turns)
o	Autorotative landing
p	Practice forced landing with power recovery
q	Power checks, reconnaissance technique, approach and departure technique
SECTION 3 NAVIGATION AND EN-ROUTE PROCEDURES	
a	Navigation and orientation at various altitudes or heights and map reading
b	Altitude or height, speed, heading control, observation of airspace and altimeter setting
c	Monitoring of flight progress, flight-log, fuel usage, endurance, ETA, assessment of track error, re-establishment of correct track and instrument monitoring
d	Observation of weather conditions and diversion planning
e	Collision avoidance (look-out procedures)
f	ATC liaison with due observance of regulations
SECTION 4 FLIGHT PROCEDURES AND MANOEUVRES	
a	Level flight, control of heading, altitude or height and speed
b	Climbing and descending turns to specified headings
c	Level turns with up to 30 ° bank, 180 ° to 360 ° left and right
SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES (SIMULATED WHERE APPROPRIATE)	
Note: The FE selects 4 items from the following:	
a	Engine malfunctions, including governor failure, carburettor or engine icing and oil system, as appropriate
b	Fuel system malfunction
c	Electrical system malfunction
d	Hydraulic system malfunction, including approach and landing without hydraulics, as applicable
e	Main rotor or anti-torque system malfunction (FFS or discussion only)
f	Fire drills, including smoke control and removal, as applicable
g	Other abnormal and emergency procedures as outlined in appropriate flight manual

AMC1 FCL.125; FCL.235

Contents of the skill test for the issue of a LAPL(S) and of an SPL

(a) An applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board.

(b) The applicant should indicate to the FE the checks and duties carried out. Checks should be completed in accordance with the flight manual or the authorised checklist for the sailplane on which the test is being taken.

Flight test tolerance

(c) The applicant should demonstrate the ability to:

(1) operate the sailplane within its limitations;

(2) complete all manoeuvres with smoothness and accuracy;

(3) exercise good judgment and airmanship;

(4) apply aeronautical knowledge;

(5) maintain control of the sailplane at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

Content of the skill test

(d) The skill test contents and sections set out in this AMC should be used for the skill test for the issue of a LAPL(S) and of an SPL:

SECTION 1 PRE-FLIGHT OPERATIONS AND DEPARTURE	
Use of checklist, airmanship (control of sailplane by external visual reference), look-out. Apply in all sections.	
a	Pre-flight sailplane (daily) inspection, documentation, NOTAM and weather briefing
b	Verifying in-limits mass and balance and performance calculation
c	Sailplane servicing compliance
d	Pre-take-off checks
SECTION 2 LAUNCH METHOD Note: at least for one of the three launch methods all the mentioned items are fully exercised during the skill test	
SECTION 2 (A) WINCH OR CAR LAUNCH	
a	Signals before and during launch, including messages to winch driver
b	Adequate profile of winch launch
c	Simulated launch failure
d	Situational awareness
SECTION 2 (B) AEROTOW LAUNCH	
a	Signals before and during launch, including signals to or communications with tow plane pilot for any problems
b	Initial roll and take-off climb
c	Launch abandonment (simulation only or 'talk-through')
d	Correct positioning during straight flight and turns
e	Out of position and recovery
f	Correct release from tow
g	Look-out and airmanship through whole launch phase

SECTION 2 (C) SELF-LAUNCH (powered sailplanes only)	
a	ATC compliance (if applicable)
b	Aerodrome departure procedures
c	Initial roll and take-off climb
d	Look-out and airmanship during the whole take-off
e	Simulated engine failure after take-off
f	Engine shut down and stowage
SECTION 3 GENERAL AIRWORK	
a	Maintain straight flight: attitude and speed control
b	Coordinated medium (30 ° bank) turns, look-out procedures and collision avoidance
c	Turning on to selected headings visually and with use of compass
d	Flight at high angle of attack (critically low air speed)
e	Clean stall and recovery
f	Spin avoidance and recovery
g	Steep (45 ° bank) turns, look-out procedures and collision avoidance
h	Local area navigation and awareness
SECTION 4 CIRCUIT, APPROACH AND LANDING	
a	Aerodrome circuit joining procedure
b	Collision avoidance: look-out procedures
c	Pre-landing checks
d	Circuit, approach control and landing
e	Precision landing (simulation of out-landing and short field)
f	Crosswind landing if suitable conditions available

AMC2 FCL.125; FCL.235

Contents of the skill test for the issue of a LAPL(B) and a BPL

(a) The take-off site should be chosen by the applicant depending on the actual meteorological conditions, the area which has to be over flown and the possible options for suitable landing sites. The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board.

(b) An applicant should indicate to the FE the checks and duties carried out. Checks should be completed in accordance with the flight manual or the authorised checklist for the balloon on which the test is being taken. During pre-flight preparation for the test the applicant should be required to perform crew and passenger briefings and demonstrate crowd control. The load calculation should

be performed by the applicant in compliance with the operations manual or flight manual for the balloon used.

Flight test tolerance

(c) The applicant should demonstrate the ability to:

(1) operate the balloon within its limitations;

(2) complete all manoeuvres with smoothness and accuracy

(3) exercise good judgment and airmanship;

(4) apply aeronautical knowledge;

(5) maintain control of the balloon at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

Content of the skill test

(d) The skill test contents and sections set out in this paragraph should be used for the skill test for the issue of a LAPL(B) (hot-air balloon) and a BPL (hot-air balloon):

SECTION 1 PRE-FLIGHT OPERATIONS, INFLATION AND TAKE-OFF	
Use of checklist, airmanship, control of balloon by external visual reference, look-out procedures, etc. apply in all sections.	
A	Pre-flight documentation, flight planning, NOTAM and weather briefing
B	Balloon inspection and servicing
C	Load calculation
D	Crowd control, crew and passenger briefings
E	Assembly and layout
F	Inflation and pre-take-off procedures
g	Take-off
h	ATC compliance(if applicable)
SECTION 2 GENERAL AIRWORK	
a	Climb to level flight
b	Level flight
c	Descent to level flight
d	Operating at low level
e	ATC compliance (if applicable)

SECTION 3 EN-ROUTE PROCEDURES	
a	Dead reckoning and map reading
b	Marking positions and time
c	Orientation and airspace structure
d	Maintenance of altitude
e	Fuel management
f	Communication with retrieve crew
g	ATC compliance
SECTION 4 APPROACH AND LANDING PROCEDURES	
a	Approach from low level, missed approach and fly on
b	Approach from high level, missed approach and fly on
c	Pre-landing checks
d	Passenger pre-landing briefing
e	Selection of landing field
f	Landing, dragging and deflation
g	ATC compliance (if applicable)
h	Actions after flight
SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES	
a	Simulated fire on the ground and in the air
b	Simulated pilot light and burner failures
c	Other abnormal and emergency procedures as outlined in the appropriate flight manual.
d	Oral questions

The skill test contents and sections set out in this paragraph should be used for the skill test for the issue of a LAPL(B) (gas balloon) and a BPL (gas balloon):

SECTION 1 PRE-FLIGHT OPERATIONS, INFLATION AND TAKE-OFF	
Use of checklist, airmanship, control of balloon by external visual reference, look-out procedures, etc. apply in all sections.	
a	Pre-flight documentation, flight planning, NOTAM and weather briefing
b	Balloon inspection and servicing
c	Load calculation
d	Crowd control, crew and passenger briefings
e	Assembly and layout
f	Inflation and pre-take-off procedures
g	Take-off
h	ATC compliance (if applicable)
SECTION 2 GENERAL AIRWORK	
a	Climb to level flight
b	Level flight
c	Descent to level flight
d	Operating at low level
e	ATC compliance (if applicable)

SECTION 3 EN-ROUTE PROCEDURES	
a	Dead reckoning and map reading
b	Marking positions and time
c	Orientation and airspace structure
d	Maintenance of altitude
e	Ballast management
f	Communication with retrieve crew
g	ATC compliance
SECTION 4 APPROACH AND LANDING PROCEDURES	
a	Approach from low level, missed approach and fly on
b	Approach from high level, missed approach and fly on
c	Pre-landing checks
d	Passenger pre-landing briefing
e	Selection of landing field
f	Landing, dragging and deflation
g	ATC compliance (if applicable)
h	Actions after flight
SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES	
a	Simulated closed appendix during take-off and climb
b	Simulated parachute or valve failure
c	Other abnormal and emergency procedures as outlined in the appropriate flight manual
d	Oral questions

AMC1 FCL.110.A LAPL(A) Experience requirements and crediting

Flight instruction for the LAPL (A)

(a) Entry to training

Before being accepted for training an applicant should be informed that the appropriate medical certificate must be obtained before solo flying is permitted.

(b) Flight instruction

(1) The LAPL (A) flight instruction syllabus should take into account the principles of threat and error management and also cover:

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

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

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

(iv) flight at critically low air speeds, recognition of, and recovery from, incipient and full stalls;

(v) flight at critically high air speeds, recognition of, and recovery from, spiral dive;

(vi) normal and crosswind take-offs and landings;

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

(viii) cross-country flying using visual reference, dead reckoning and radio navigation aids;

(ix) emergency operations, including simulated aeroplane equipment malfunctions;

(x) operations to, from and transiting controlled aerodromes, compliance with air traffic services procedures and communication procedures.

(2) Before allowing the applicant to undertake his/her first solo flight, the FI should ensure that the applicant can operate the required systems and equipment.

(c) Syllabus of flight instruction

(1) 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:

(i) the applicant's progress and ability;

(ii) the weather conditions affecting the flight;

(iii) the flight time available;

(iv) instructional technique considerations;

(v) the local operating environment;

(vi) applicability of the exercises to the aeroplane or TMG type.

(2) Each of the exercises involves the need for the applicant to be aware of the needs of good airmanship and look-out, which should be emphasised at all times.

(i) Exercise 1a: Familiarisation with the aeroplane or TMG:

(A) characteristics of the aeroplane or TMG;

(B) cockpit layout;

(C) systems;
(D) checklists, drills and controls.

(ii) Exercise 1b: Emergency drills:
(A) action if fire on the ground and in the air;
(B) engine cabin and electrical system fire;
(C) systems failure;
(D) escape drills, location and use of emergency equipment and exits.

(iii) Exercise 2: Preparation for and action after flight:
(A) flight authorisation and aeroplane or TMG acceptance;
(B) serviceability documents;
(C) equipment required, maps, etc.;
(D) external checks;
(E) internal checks;
(F) harness, seat or rudder panel adjustments;
(G) starting and warm-up checks;
(H) power checks;
(I) running down system checks and switching off the engine;
(J) parking, security and picketing (for example tie down);
(K) completion of authorisation sheet and serviceability documents.

(iv) Exercise 3: Air experience: flight exercise.

(v) Exercise 4: Effects of controls:
(A) primary effects when laterally level and when banked;
(B) further effects of aileron and rudder;
(C) effects of:
(a) air speed;
(b) slipstream;
(c) power;
(d) trimming controls;
(e) flaps;
(f) other controls, as applicable.
(H) operation of:
(a) mixture control;
(b) carburettor heat;
(c) cabin heating or ventilation.

(vi) Exercise 5a: Taxiing:
(A) pre-taxi checks;
(B) starting, control of speed and stopping;
(C) engine handling;
(D) control of direction and turning;
(E) turning in confined spaces;
(F) parking area procedure and precautions;
(G) effects of wind and use of flying controls;
(H) effects of ground surface;

(I) freedom of rudder movement;
(J) marshalling signals;
(K) instrument checks;
(L) air traffic control procedures.

(vii) Exercise 5b: Emergencies: brake and steering failure.

(viii) Exercise 6: Straight and level:
(A) at normal cruising power, attaining and maintaining straight and level flight;
(B) flight at critically high air speeds;
(C) demonstration of inherent stability;
(D) control in pitch, including use of trim;
(E) lateral level, direction and balance, trim;
(F) at selected air speeds (use of power);
(G) during speed and configuration changes;
(H) use of instruments for precision.

(ix) Exercise 7: Climbing:
(A) entry, maintaining the normal and max rate climb, levelling off;
(B) levelling off at selected altitudes;
(C) en-route climb (cruise climb);
(D) climbing with flap down;
(E) recovery to normal climb;
(F) maximum angle of climb;
(G) use of instruments for precision.

(x) Exercise 8: Descending:
(A) entry, maintaining and levelling off;
(B) levelling off at selected altitudes;
(C) glide, powered and cruise descent (including effect of power and air speed);
(D) side slipping (on suitable types);
(E) use of instruments for precision flight.

(xi) Exercise 9: Turning:
(A) entry and maintaining medium level turns;
(B) resuming straight flight;
(C) faults in the turn (in correct pitch, bank and balance);
(D) climbing turns;
(E) descending turns;
(F) slipping turns (for suitable types);
(G) turns onto selected headings, use of gyro heading indicator and compass;
(H) use of instruments for precision.

(xii) Exercise 10a: 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 aeroplane or TMG in balance while returning to normal air speed.

(A) safety checks;
(B) introduction to slow flight;
(C) controlled flight down to critically slow air speed;
(D) application of full power with correct attitude and balance to achieve normal climb speed.

(xiii) Exercise 10b: Stalling:
(A) safety checks;
(B) symptoms;
(C) recognition;
(D) clean stall and recovery without power and with power;
(E) recovery when a wing drops;
(F) approach to stall in the approach and in the landing configurations, with and without power and recovery at the incipient stage.

(xiv) Exercise 11: Spin avoidance:
(A) safety checks;
(B) stalling and recovery at the incipient spin stage (stall with excessive wing drop, about 45°);
(C) instructor induced distractions during the stall.

(xv) Exercise 12: Take-off and climb to downwind position:
(A) pre-take-off checks;
(B) into wind take-off;
(C) safeguarding the nose wheel (if applicable);
(D) crosswind take-off;
(E) drills during and after take-off;
(F) short take-off and soft field procedure or techniques including performance calculations;
(G) noise abatement procedures.

(xvi) Exercise 13: Circuit, approach and landing:
(A) circuit procedures, downwind and base leg;
(B) powered approach and landing;
(C) safeguarding the nose wheel (if applicable);
(D) effect of wind on approach and touchdown speeds and use of flaps;
(E) crosswind approach and landing;
(F) glide approach and landing;
(G) short landing and soft field procedures or techniques;
(H) flapless approach and landing;
(I) wheel landing (tail wheel aeroplanes);
(J) missed approach and go-around;
(K) noise abatement procedures.

(xvii) Exercise 12/13: Emergencies:
(A) abandoned take-off;
(B) engine failure after take-off;
(C) mislanding and go-around;
(D) missed approach.

Note: in the interests of safety, it will be necessary for pilots trained on nose wheel aeroplanes or TMGs to undergo dual conversion training before flying tail wheel aeroplanes or TMGs, and vice versa.

(xviii) Exercise 14: First solo:

(A) instructor's briefing including limitations;

(B) use of required equipment;

(C) observation of flight and de-briefing by instructor.

Note: during flights immediately following the solo circuit consolidation the following should be revised:

(A) procedures for leaving and re-joining the circuit;

(B) the local area, restrictions, map reading;

(C) use of radio aids for homing;

(D) turns using magnetic compass, compass errors.

(xix) Exercise 15: Advanced turning:

(A) steep turns (45 °), level and descending;

(B) stalling in the turn and recovery;

(C) recoveries from unusual attitudes, including spiral dives.

(xx) Exercise 16: Forced landing without power:

(A) forced landing procedure;

(B) choice of landing area, provision for change of plan;

(C) gliding distance;

(D) descent plan;

(E) key positions;

(F) engine cooling;

(G) engine failure checks;

(H) use of radio;

(I) base leg;

(J) final approach;

(K) landing;

(L) actions after landing.

(xxi) Exercise 17: Precautionary landing:

(A) full procedure away from aerodrome to break-off height;

(B) occasions necessitating a precautionary landing;

(C) in-flight conditions;

(D) landing area selection:

(a) normal aerodrome;

(b) disused aerodrome;

(c) ordinary field.

(I) circuit and approach;

(J) actions after landing.

(xxii) Exercise 18a: Navigation:

(A) flight planning:

(a) weather forecast and actuals;

(b) map selection and preparation:

(1) choice of route;
(2) airspace structure;
(3) safety altitudes.

(c) calculations:
(1) magnetic heading(s) and time(s) en-route;
(2) fuel consumption;
(3) mass and balance;
(4) mass and performance.

(d) flight information:
(1) NOTAMs, etc.;
(2) radio frequencies;
(3) selection of alternate aerodromes.

(e) aeroplane or TMG documentation;

(f) notification of the flight:
(1) pre-flight administrative procedures;
(2) flight plan form.

(B) departure:

(a) organisation of cockpit workload;

(b) departure procedures:
(1) altimeter settings;
(2) ATC liaison in regulated airspace;
(3) setting heading procedure;
(4) noting of ETAs.

(c) maintenance of altitude and heading;

(d) revisions of ETA and heading;

(e) log keeping;

(f) use of radio;

(g) minimum weather conditions for continuation of flight;

(h) in-flight decisions;

(i) transiting controlled or regulated airspace;

(j) diversion procedures;

(k) uncertainty of position procedure;

(l) lost procedure.

(K) arrival and aerodrome joining procedure:

(a) ATC liaison in regulated airspace;

(b) altimeter setting;

(c) entering the traffic pattern;

(d) circuit procedures;

(e) parking;

(f) security of aeroplane or TMG;

(g) refuelling;

(h) closing of flight plan, if appropriate;

(i) post-flight administrative procedures.

(xxiii) Exercise 18b: Navigation problems at lower levels and in reduced visibility:
- (A) actions before descending;
- (B) hazards (for example obstacles, and terrain);
- (C) difficulties of map reading;
- (D) effects of wind and turbulence;
- (E) vertical situational awareness (avoidance of controlled flight into terrain);
- (F) avoidance of noise sensitive areas;
- (G) joining the circuit;
- (H) bad weather circuit and landing.

(xxiv) Exercise 18c: Radio navigation (basics):
- (A) use of GNSS or VOR/ADF:
  - (a) selection of waypoints or stations;
  - (b) to or from indications and orientation;
  - (c) error messages.
- (B) use of VHF/DF:
  - (a) availability, AIP and frequencies;
  - (b) R/T procedures and ATC liaison;
  - (c) obtaining a QDM and homing.
- (C) use of en-route or terminal radar:
  - (a) availability and AIP;
  - (b) procedures and ATC liaison;
  - (c) pilot's responsibilities;
  - (d) secondary surveillance radar:
    - (1) transponders;
    - (2) code selection;
    - (3) interrogation and reply.

(xxv) Exercise 19: Stopping and restarting the engine (in the case of TMGs only):
- (A) engine cooling;
- (B) switching-off procedure;
- (C) restarting of the engine.

AMC2 FCL.110.A LAPL(A) Experience requirements and crediting

Crediting: pre-entry flight test

The pre-entry flight test referred to in FCL.110.A(c) should cover the total content of the syllabus of flight instruction for the issuance of the LAPL(A), in accordance with AMC1 FCL.110.A.

GM1 FCL.135.A; FCL.135.H

Differences and familiarisation training

(a) Differences training requires the acquisition of additional knowledge and training on an appropriate training device or the aircraft.

(b) Familiarisation training requires the acquisition of additional knowledge

AMC1 FCL.110.H LAPL(H) Experience requirements and crediting

Flight instruction for the LAPL(H)

(a) Entry to training

Before being accepted for training an applicant should be informed that the appropriate medical certificate must be obtained before solo flying is permitted.

(b) Flight instruction

(1) The LAPL(H) flight instruction syllabus should take into account the principles of threat and error management and also cover:

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

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

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

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

(v) emergency procedures, basic autorotations, simulated engine failure and ground resonance recovery if relevant to type;

(vi) sideways and backwards flight and turns on the spot;

(vii) incipient vortex ring recognition and recovery;

(viii) touchdown autorotations, simulated engine-off landings, practice forced landings. Simulated equipment malfunctions and emergency procedures relating to malfunctions of engines, controls, electrical and hydraulic circuits;

(ix) steep turns;

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

(xi) limited power and confined area operations including selection of and operations to and from unprepared sites;

(xii) cross-country flying by using visual reference, dead reckoning and, where available and radio navigation aids;

(xiii) operations to and from aerodromes; compliance with air traffic services procedures and communication procedures.

(2) Before allowing the applicant to undertake his/her first solo flight, the FI should ensure that the applicant can operate the required systems and equipment.

(c) Syllabus of flight instruction

(1) 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:

(i) the applicant’s progress and ability;

(ii) the weather conditions affecting the flight;

(iii) the flight time available;

(iv) instructional technique considerations;

(v) the local operating environment;

(vi) applicability of the exercises to the helicopter type.

(2) Each of the exercises involves the need for the applicant to be aware of the needs of good airmanship and look-out, which should be emphasised at all times.

(i) Exercise 1a: Familiarisation with the helicopter:

(A) characteristics of the helicopter, external features;

(B) cockpit layout;

(C) systems;

(D) checklists, procedures, controls.

(ii) Exercise 1b: Emergency procedures:

(A) action if fire on the ground and in the air;

(B) engine, cabin and electrical system fire;

(C) systems failures;

(D) escape drills, location and use of emergency equipment and exits.

(iii) Exercise 2: Preparation for and action after flight:

(A) flight authorisation and helicopter acceptance;

(B) serviceability documents;

(C) equipment required, maps, etc.;

(D) external checks;

(E) internal checks;

(F) seat, harness and flight controls adjustments;

(G) starting and warm-up checks clutch engagement and starting rotors;

(H) power checks;

(I) running down system checks and switching off the engine;

(J) parking, security and picketing;

(K) completion of authorisation sheet and serviceability documents.

(iv) Exercise 3: Air experience:

(A) to introduce the student to rotary wing flight;

(B) flight exercise.

(v) Exercise 4: Effects of controls:

(A) function of flight controls, primary and secondary effect;

(B) effect of air speed;

(C) effect of power changes (torque);

(D) effect of yaw (sideslip);

(E) effect of disc loading (bank and flare);

(F) effect on controls of selecting hydraulics on/off;

(G) effect of control friction;

(H) instruments;

(I) use of carburettor heat or anti-icing control.

(vi) Exercise 5: Power and attitude changes:

(A) relationship between cyclic control position, disc attitude, fuselage attitude and air speed;

(B) flapback;

(C) power required diagram in relation to air speed;

(D) power and air speed changes in level flight;

(E) use of instruments for precision;

(F) engine and air speed limitations.

(vii) Exercise 6a: Straight and level:

(A) at normal cruising power, attaining and maintaining straight and level flight;

(B) control in pitch, including use of control friction or trim;

(C) maintaining direction and balance, (ball or yawstring use);

(D) setting power for selected air speeds and speed changes;

(E) use of instruments for precision.

(viii) Exercise 6b: Climbing:

(A) optimum climb speed, best angle or rate of climb from power required diagram;

(B) initiation, maintaining the normal and maximum rate of climb, levelling off;

(C) levelling off at selected altitudes or heights;

(D) use of instruments for precision.

(ix) Exercise 6c: Descending:

(A) optimum descent speed and best angle or rate of descent from power required diagram;

(B) initiation, maintaining and levelling off;

(C) levelling off at selected altitudes or heights;

(D) descent (including effect of power and air speed);

(E) use of instruments for precision.

(x) Exercise 6d: Turning:

(A) initiation and maintaining medium level turns;

(B) resuming straight flight;

(C) altitude, bank and coordination;

(D) climbing and descending turns and effect on rate of climb or descent;

(E) turns onto selected headings, use of gyro heading indicator and compass;

(F) use of instruments for precision.

(xi) Exercise 7: Basic autorotation:

(A) safety checks, verbal warning and look-out;

(B) entry, development and characteristics;

(C) control of air speed and RRPM, rotor and engine limitations;

(D) effect of AUM, IAS, disc loading, G-forces and density altitude

(E) re-engagement and go-around procedures (throttle over-ride or ERPM control);

(F) vortex condition during recovery;

(G) gentle and medium turns in autorotation;

(H) demonstration of variable flare simulated engine off landing.

(xii) Exercise 8a: Hovering:

(A) demonstrate hover IGE, importance of wind effect and attitude, ground cushion, stability in the hover, effects of over controlling;

(B) student holding cyclic stick only;

(C) student handling collective lever (and throttle) only;

(D) student handling collective lever, (throttle) and pedals;

(E) student handling all controls;

(F) demonstration of ground effect;

(G) demonstration of wind effect;

(H) demonstrate gentle forward running touchdown;

(I) specific hazards, for example snow, dust and litter.

(xiii) Exercise 8b: Hover taxiing and spot turns:

(A) revise hovering;

(B) precise ground speed and height control;

(C) effect of wind direction on helicopter attitude and control margin;

(D) control and coordination during spot turns;

(E) carefully introduce gentle forward running touchdown.

(xiv) Exercise 8c: Hovering and taxiing emergencies:

(A) revise hovering and gentle forward running touchdown, explain (demonstrate where applicable) effect of hydraulics failure in the hover;

(B) demonstrate simulated engine failure in the hover and hover taxi.

(C) demonstrate dangers of mishandling and over-pitching.

(xv) Exercise 9: Take-off and landing

(A) pre-take-off checks or drills;

(B) look-out;

(C) lifting to hover;

(D) after take-off checks;

(E) danger of horizontal movement near ground;

(F) danger of mishandling and overpitching;

(G) landing (without sideways or backwards movement);

(H) after landing checks or drills;

(I) take-off and landing crosswind and downwind.

(xvi) Exercise 10: Transitions from hover to climb and approach to hover:

(A) look-out;

(B) revise take-off and landing;

(C) ground effect, translational lift and its effects;

(D) flapback and its effects;

(E) effect of wind speed and direction during transitions from or to the hover;

(F) the constant angle approach;

(G) demonstration of variable flare simulated engine off landing.

(xvii) Exercise 11a: Circuit, approach and landing:

(A) revise transitions from hover to climb and approach to hover;

(B) circuit procedures, downwind and base leg;

(C) approach and landing with power;

(D) pre-landing checks;

(E) effect of wind on approach and IGE hover

(F) crosswind approach and landing;

(G) go-around;

(H) noise abatement procedures.

(xviii) Exercise 11b: Steep and limited power approaches and landings:

(A) revise the constant angle approach;

(B) the steep approach (explain danger of high sink rate and low air speed);

(C) limited power approach (explain danger of high speed at touch down);

(D) use of the ground effect;

(E) variable flare simulated engine off landing.

(xix) Exercise 11c: Emergency procedures:

(A) abandoned take-off;

(B) missed approach and go-around;

(C) hydraulic off landing (if applicable);

(D) tail rotor control or tail rotor drive failure (briefing only);

(E) simulated emergencies in the circuit to include:

(F) hydraulics failure;

(G) simulated engine failure on take-off, crosswind, downwind and base leg;

(H) governor failure.

(xx) Exercise 12: First solo:

(A) instructor's briefing, observation of flight and debriefing;

(B) warn of change of attitude from reduced and laterally displaced weight;

(C) warn of low tail, low skid or wheel during hover and landing;

(D) warn of dangers of loss of RRPM and overpitching;

(E) pre-take-off checks;

(F) into wind take-off;

(G) procedures during and after take-off;

(H) normal circuit, approaches and landings;

(I) action if an emergency.

(xxi) Exercise 13: Sideways and backwards hover manoeuvring:

(A) manoeuvring sideways flight heading into wind;

(B) manoeuvring backwards flight heading into wind;

(C) combination of sideways and backwards manoeuvring;

(D) manoeuvring sideways and backwards, heading out of wind;

(E) stability and weather cocking;

(F) recovery from backwards manoeuvring, (pitch nose down);

(G) groundspeed limitations for sideways and backwards manoeuvring.

(xxii) Exercise 14: Spot turns:

(A) revise hovering into wind and downwind;

(B) turn on spot through 360º:

(a) around pilots position;

(b) around tail rotor;

(c) around helicopter geometric centre;

(d) square and safe visibility clearing turn.

(C) rotor RPM control, torque effect, cyclic limiting stops due to CG position and wind speed and direction.

(xxiii) Exercise 15: Hover OGE and vortex ring:

(A) establishing hover OGE;

(B) drift, height or power control;

(C) demonstration of incipient stage of vortex ring, recognition and recovery (from a safe altitude);

(D) loss of tail rotor effectiveness.

(xxiv) Exercise 16: Simulated EOL:

(A) the effect of weight, disc loading, density attitude and RRPM decay;

(B) revise basic autorotation entry;

(C) optimum use of cyclic and collective to control speed or RRPM;

(D) variable flare simulated EOL;

(E) demonstrate constant attitude simulated EOL;

(F) demonstrate simulated EOL from hover or hover taxi;

(G) demonstrate simulated EOL from transition and low level.

(xxv) Exercise 17: Advanced autorotation:

(A) over a selected point at various height and speed;

(B) revise basic autorotation: note ground distance covered;

(C) range autorotation;

(D) low speed autorotation;

(E) constant attitude autorotation (terminate at safe altitude);

(F) 'S' turns;

(G) turns through 180° and 360°;

(H) effects on angles of descent, IAS, RRPM and effect of AUM.

(xxvi) Exercise 18: Practice forced landings:

(A) procedure and choice of the forced landing area;

(B) forced landing checks and crash action;

(C) re-engagement and go-around procedures.

(xxvii) Exercise 19: Steep turns:

(A) steep (level) turns (30° bank);

(B) maximum rate turns (45° bank if possible);

(C) steep autorotative turns;

(D) faults in the turn: balance, attitude, bank and coordination;

(E) RRPM control and disc loading;

(F) vibration and control feedback;

(G) effect of wind at low level.

(xxviii) Exercise 20: Transitions:

(A) revise ground effect, translational lift and flapback;

(B) maintaining constant height, (20–30 ft AGL):

(C) transition from hover to minimum 50 knots IAS and back to hover;

(D) demonstrate effect of wind.

(xxix) Exercise 21: Quick stops:

(A) use of power and controls;

(B) effect of wind;

(C) quick stops into wind;

(D) quick stops from crosswind and downwind terminating into wind;

(E) danger of vortex ring;

(F) danger of high disc loading.

(xxx) Exercise 22a: Navigation:

(A) Flight planning:

(a) weather forecast and actuals;

(b) map selection and preparation and use:

(1) choice of route;

(2) controlled airspace, danger and prohibited areas;

(3) safety altitudes and noise abatement considerations.

(c) calculations:

(1) magnetic heading(s) and time(s) en-route;

(2) fuel consumption;

(3) mass and balance.

(d) flight information:

(1) NOTAMs, etc.;

(2) radio frequencies;

(3) selection of alternate landing sites.

(e) helicopter documentation;

(f) notification of the flight:

(1) pre-flight administrative procedures;

(2) flight plan form (where appropriate).

(B) Departure:

(a) organisation of cockpit workload;

(b) departure procedures:

(1) altimeter settings;

(2) ATC liaison in regulated airspace;

(3) setting heading procedure;

(4) noting of ETAs.

(c) maintenance of height or altitude and heading;

(d) revisions of ETA and heading:

(1) 10° line, double track, track error and closing angle;

(2) 1 in 60 rule;

(3) amending an ETA.

(e) log keeping;

(f) use of radio;

(g) minimum weather conditions for continuation of flight;

(h) in-flight decisions;

(i) transiting controlled or regulated airspace;

(j) uncertainty of position procedure;

(k) lost procedure.

(C) Arrival and aerodrome joining procedure:

(a) ATC liaison in regulated airspace;

(b) altimeter setting;

(c) entering the traffic pattern;

(d) circuit procedures;

(e) parking;

(f) security of helicopter;

(g) refuelling;

(h) closing of flight plan, (if appropriate);

(i) post-flight administrative procedures.

(xxxi) Exercise 22b: Navigation problems at low heights and in reduced visibility:

(A) actions before descending;

(B) hazards (for example obstacles and other aircraft);

(C) difficulties of map reading;

(D) effects of wind and turbulence;

(E) avoidance of noise sensitive areas;

(F) joining the circuit;

(G) bad weather circuit and landing;

(H) appropriate procedures and choice of landing area for precautionary landings.

(xxxii) Exercise 22c: Radio navigation (basics):

(A) Use of GNNS or VOR/NDB:

(a) selection of waypoints;

(b) to or from indications or orientation;

(c) error messages.

(B) Use of VHF/DF:

(a) availability, AIP and frequencies;

(b) R/T procedures and ATC liaison;

(c) obtaining a QDM and homing.

(C) Use of en-route or terminal radar:

(a) availability and AIP;

(b) procedures and ATC liaison;

(c) pilot's responsibilities;

(d) secondary surveillance radar:

(1) transponders;

(2) code selection;

(3) interrogation and reply.

(xxxiii) Exercise 23: Advanced take-off, landings and transitions:

(A) landing and take-off out of wind (performance reduction);

(B) ground effect, translational lift and directional stability variation when out of wind;

(C) downwind transitions;

(D) vertical take-off over obstacles;

(E) reconnaissance of landing site;

(F) running landing;

(G) zero speed landing;

(H) crosswind and downwind landings;

(I) steep approach;

(J) go-around.

(xxxiv) Exercise 24: Sloping ground:

(A) limitations and assessing slope angle;

(B) wind and slope relationship: blade and control stops;

(C) effect of CG when on slope;

(D) ground effect on slope and power required;

(E) right skid up slope;

(F) left skid up slope;

(G) nose up slope;

(H) avoidance of dynamic roll over, dangers soft ground and sideways movement on touchdown;

(I) danger of striking main or tail rotor by harsh control movement near ground.

(xxxv) Exercise 25: Limited power:

(A) take-off power check;

(B) vertical take-off over obstacles;
(C) in-flight power check;
(D) running landing;
(E) zero speed landing;
(F) approach to low hover;
(G) approach to hover;
(H) approach to hover OGE;
(I) steep approach;
(J) go-around.

(xxxvi) Exercise 26: Confined areas:

(A) landing capability and performance assessment;
(B) locating landing site and assessing wind speed and direction;
(C) reconnaissance of landing site;
(D) select markers;
(E) select direction and type of approach;
(F) circuit;
(G) approach to committed point and go-around;
(H) approach;
(I) clearing turn;
(J) landing;
(K) power check and performance assessment in and OGE;
(L) normal take-off to best angle of climb speed;
(L) vertical take-off from hover.

AMC2 FCL.110.H LAPL(H) Experience requirements and crediting

Crediting: pre-entry flight test

The pre-entry flight test referred to in FCL.110.H(b) should cover the total content of the syllabus of flight instruction for the issuance of the LAPL(H), in accordance with AMC1 FCL.110.H.

GM1 FCL.135.A; FCL.135.H

DIFFERENCES AND FAMILIARISATION TRAINING

(a) Differences training requires the acquisition of additional knowledge and training on an appropriate training device or the aircraft.

(b) Familiarisation training requires the acquisition of additional knowledge.

AMC1 FCL.110.S LAPL(S) Experience requirements and crediting

Crediting: pre-entry flight test

The pre-entry flight test referred to in FCL.110.S(c) should cover the total content of the syllabus of flight instruction for the issuance of the LAPL(S), in accordance with AMC1 FCL.110.S and FCL.210.S.

AMC1 FCL.110.S; FCL.210.S

Flight instruction for the LAPL(S) and the SPL

(a) Entry to training

Before being accepted for training an applicant should be informed that the appropriate medical certificate must be obtained before solo flying is permitted.

(b) Flight instruction

(1) The LAPL (S) and SPL flight instruction syllabus should take into account the principles of threat and error management and also cover:

(i) pre-flight operations, including verifying mass and balance, aircraft inspection and servicing, airspace and weather briefing;

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

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

(iv) flight at high angle of attack (critically low air speeds), recognition of, and recovery from, incipient and full stalls and spins;

(v) flight at critically high air speeds, recognition of, and recovery from spiral dive;

(vi) normal and crosswind take-offs in respect with the different launch methods;

(vii) normal and crosswind landings;

(viii) short field landings and outlandings: field selection, circuit and landing hazards and precautions;

(ix) cross-country flying using visual reference, dead reckoning and available navigation aids;

(x) soaring techniques as appropriate to site conditions;

(xi) emergency actions;

(xii) compliance with air traffic services procedures and communication procedures.

(2) Before allowing the applicant to undertake his/her first solo flight, the FI should ensure that the applicant can operate the required systems and equipment.

(c) Syllabus of flight instruction

(1) 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:

(i) the applicant’s progress and ability;

(ii) the weather conditions affecting the flight;

(iii) the flight time available;

(iv) instructional technique considerations;

(v) the local operating environment;

(vi) applicability of the exercises to the sailplane type.

(2) At the discretion of the instructors some of the exercises may be combined and some other exercises may be done in several flights.

(3) At least the exercises 1 to 12 have to be completed before the first solo flight.

(4) Each of the exercises involves the need for the applicant to be aware of the needs for good airmanship and look-out, which should be emphasised at all times.

(i) Exercise 1: Familiarisation with the sailplane:

(A) characteristics of the sailplane;

(B) cockpit layout: instruments and equipment;

(C) light controls: stick, pedals, airbrakes, flaps and trim;

(D) cable release and undercarriage;

(E) checklists, drills and controls.

(ii) Exercise 2: Procedures if emergencies:

(A) use of safety equipment (parachute);

(B) action if system failures;

(C) bail-out procedures.

(iii) Exercise 3: Preparation for flight:

(A) pre-flight briefings;

(B) required documents on board;

(C) equipment required for the intended flight;

(D) ground handling, movements, tow out, parking and security;

(E) pre-flight external and internal checks;

(F) verifying in-limits mass and balance;

(G) harness, seat or rudder panel adjustments;

(H) passenger handling;

(I) pre-launch checks.

(iv) Exercise 4: Initial air experience:

(A) area familiarisation;

(B) look-out procedures.

(v) Exercise 5: Effects of controls:

(A) look-out procedures;

(B) use of visual references;

(C) primary effects when laterally level and when banked;

(D) reference attitude and effect of elevator;

(E) relationship between attitude and speed;

(F) effects of:

(a) flaps (if available);

(b) airbrakes.

(vi) Exercise 6: Coordinated rolling to and from moderate angles of bank:

(A) look-out procedures;

(B) further effects of aileron (adverse yaw) and rudder (roll);

(C) coordination;

(D) rolling to and from moderate angles of bank and return to straight flight.

(vii) Exercise 7: Straight flying:

(A) look-out procedures;

(B) maintaining straight flight;

(C) flight at critically high air speeds;

(D) demonstration of inherent pitch stability;

(E) control in pitch, including use of trim;

(F) lateral level, direction and balance and trim;

(G) air speed: instrument monitoring and control.

(viii) Exercise 8: Turning:

(A) look-out procedures;

(B) demonstration and correction of adverse yaw;

(C) entry to turn (medium level turns);

(D) stabilising turns;

(E) exiting turns;

(F) faults in the turn (slipping and skidding);

(G) turns on to selected headings and use of compass;

(H) use of instruments (ball indicator or slip string) for precision.

(ix) Exercise 9a: Slow flight:

Note: the objective is to improve the student's ability to recognise inadvertent flight at critically low speeds (high angle of attack) and to provide practice in maintaining the sailplane in balance while returning to normal attitude (speed).

(A) safety checks;

(B) introduction to characteristics of slow flight;

(C) controlled flight down to critically high angle of attack (slow air speed).

(x) Exercise 9b: Stalling:

(A) safety checks;

(B) pre-stall symptoms, recognition and recovery;

(C) stall symptoms, recognition and recovery;

(D) recovery when a wing drops;

(E) approach to stall in the approach and in the landing configurations;

(F) recognition and recovery from accelerated stalls.

(xi) Exercise 10: Spin recognition and spin avoidance:

(A) safety checks;

(B) stalling and recovery at the incipient spin stage (stall with excessive wing drop, about 45°);

(C) entry into fully developed spins (if suitable training aircraft available);

(D) recognition of full spins (if suitable training aircraft available);

(E) standard spin recovery (if suitable training aircraft available);

(F) instructor induced distractions during the spin entry (if suitable training aircraft available).

Note: consideration of manoeuvre limitations and the need to refer to the sailplane manual and mass and balance calculations. If no suitable training aircraft is available to demonstrate the fully developed spin, all the aspects related to these training items have to be covered by specific theoretical instruction.

(xii) Exercise 11: Take-off or launch methods:

At least one launch method must be taught containing all the subjects below.

(xiii) Exercise 11a: Winch launch:

(A) signals or communication before and during launch;

(B) use of the launching equipment;

(C) pre-take-off checks;

(D) into wind take-off;

(E) crosswind take-off;

(F) optimum profile of winch launch and limitations;

(G) release procedures;

(H) launch failure procedures.

(xiv) Exercise 11b: Aero tow:

(A) signals or communication before and during launch;

(B) use of the launch equipment;

(C) pre-take-off checks;

(D) into wind take-off;

(E) crosswind take-off;

(F) on tow: straight flight, turning and slip stream;

(G) out of position in tow and recovery;

(H) descending on tow (towing aircraft and sailplane);

(I) release procedures;

(J) launch failure and abandonment.

(xv) Exercise 11c: Self-launch:

(A) engine extending and retraction procedures;

(B) engine starting and safety precautions;

(C) pre-take-off checks;

(D) noise abatement procedures;

(E) checks during and after take-off;

(F) into wind take-off;

(G) crosswind take-off;

(H) power failures and procedures;

(I) abandoned take-off;

(J) maximum performance (short field and obstacle clearance) take-off;

(K) short take-off and soft field procedure or techniques and performance calculations.

(xvi) Exercise 11d: Car launch:

(A) signals before and during launch;

(B) use of the launch equipment;

(C) pre-take-off checks;

(D) into wind take-off;

(E) crosswind take-off;

(F) optimum launch profile and limitations;

(G) release procedures;

(H) launch failure procedures.

(xvii) Exercise 11e: Bungee launch:

(A) signals before and during launch;

(B) use of the launch equipment;

(C) pre-take-off checks;

(D) into wind take-off.

(xviii) Exercise 12: Circuit, approach and landing:

(A) procedures for rejoining the circuit;

(B) collision avoidance, look-out techniques and procedures;

(C) pre-landing checks: circuit procedures, downwind and base leg;

(D) effect of wind on approach and touchdown speeds;

(E) use of flaps (if applicable);

(F) visualisation of an aiming point;

(G) approach control and use of airbrakes;

(H) normal and crosswind approach and landing;

(I) short landing procedures or techniques.

(xix) Exercise 13: First solo:

(A) instructor's briefing including limitations;

(B) awareness of local area and restrictions;

(C) use of required equipment;

(D) observation of flight and debriefing by instructor.

(xx) Exercise 14: Advanced turning:

(A) steep turns (45°);

(B) stalling and spin avoidance in the turn and recovery;

(C) recoveries from unusual attitudes, including spiral dives.

(xxi) Exercise 15: Soaring techniques:

At least one of the three soaring techniques must be taught containing all subjects below.

(xxii) Exercise 15a: Thermalling:

(A) look-out procedures;

(B) detection and recognition of thermals;

(C) use of audio soaring instruments;

(D) joining a thermal and giving way;

(E) flying in close proximity to other sailplanes;

(F) centring in thermals;

(G) leaving thermals.

(xxiii) Exercise 15b: Ridge flying:

(A) look-out procedures;

(B) practical application of ridge flying rules;

(C) optimisation of flight path;

(D) speed control.

(xxiv) Exercise 15C: Wave flying:

(A) look-out procedures;

(B) wave access techniques;

(C) speed limitations with increasing height;

(D) use of oxygen.

(xxv) Exercise 16: Out-landings:

(A) gliding range;

(B) restart procedures (only for self-launching and self-sustaining sailplanes);

(C) selection of landing area;

(D) circuit judgement and key positions;

(E) circuit and approach procedures;

(F) actions after landing.

(xxvi) Exercise 17: Cross-country flying:

If the required cross-country flight will be conducted as a solo cross-country flight, all the subjects below must be taught before.

(xxvii) Exercise 17a: Flight planning:

(A) weather forecast and actuals;

(B) NOTAMs and airspace considerations;

(C) map selection and preparation;

(D) route planning;

(E) radio frequencies (if applicable);

(F) pre-flight administrative procedure;

(G) flight plan where required;

(H) mass and performance;

(I) alternate aerodromes and landing areas;

(J) safety altitudes.

(xxviii) Exercise 17b: In-flight navigation:

(A) maintaining track and re-routing considerations;

(B) use of radio and phraseology (if applicable);

(C) in-flight planning;

(D) procedures for transiting regulated airspace or ATC liaison where required;

(E) uncertainty of position procedure;

(F) lost procedure;

(G) use of additional equipment where required;

(H) joining, arrival and circuit procedures at remote aerodrome.

(xxix) Exercise 17c: Cross-country techniques:

(A) look-out procedures;

(B) maximising potential cross-country performance;

(C) risk reduction and threat reaction.

AMC1 FCL.135.S; FCL.205.S(a)

Extension of privileges to TMG: LAPL(S) and SPL

(a) The aim of the flight training is to qualify LAPL(S) or SPL holders to exercise the privileges of the licence on a TMG.

(b) The ATO should issue a certificate of satisfactory completion of the training.

Theoretical knowledge

(c) The theoretical knowledge syllabus should cover the revision or explanation of:

(1) Principles of flight:

(i) operating limitations (addition TMG);

(ii) propellers;

(iii) flight mechanics.

(2) Operational procedures for TMG:

(i) special operational procedures and hazards;

(ii) emergency procedures.

(3) Flight performance and planning:

(i) mass and balance considerations;

(ii) loading;

(iii) CG calculation;

(iv) (iv) load and trim sheet;

(v) performance of TMGs;

(vi) flight planning for VFR flights;

(vii) fuel planning;

(viii) pre-flight preparation;

(ix) ICAO flight plan;

(x) flight monitoring and in-flight re-planning.

(4) Aircraft general knowledge:

(i) system designs, loads, stresses, maintenance;

(ii) airframe;

(iii) landing gear, wheels, tyres, brakes;

(iv) fuel system;

(v) electrics;

(vi) piston engines;

(vii) propellers;

(viii) instrument and indication systems.

(5) Navigation:

(i) dead reckoning navigation (addition powered flying elements);

(ii) in-flight navigation (addition powered flying elements);

(iii) basic radio propagation theory;

(iv) radio aids (basics);

(v) radar (basics);

(vi) GNSS.

(d) Flight instruction

(1) 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.

(2) The flying exercises should cover the revision or explanation of the following exercises:

(i) Exercise 1: Familiarisation with the TMG:

(A) characteristics of the TMG;

(B) cockpit layout;

(C) systems;

(D) checklists, drills and controls.

(ii) Exercise 1e: Emergency drills:

(A) action if fire on the ground and in the air;

(B) engine cabin and electrical system fire;

(C) systems failure;

(D) escape drills, location and use of emergency equipment and exits.

(iii) Exercise 2: Preparation for and action after flight:

(A) serviceability documents;

(B) equipment required, maps, etc.;

(C) external checks;

(D) internal checks;

(E) harness and seat or rudder panel adjustments;

(F) starting and warm-up checks;

(G) power checks;

(H) running down system checks and switching off the engine;

(I) parking, security and picketing (for example tie down);

(J) completion of authorisation sheet and serviceability documents.

(iv) Exercise 3: Taxiing:

(A) pre-taxi checks;

(B) starting, control of speed and stopping;

(C) engine handling;

(D) control of direction and turning;

(E) turning in confined spaces;

(F) parking area procedure and precautions;

(G) effects of wind and use of flying controls;

(H) effects of ground surface;

(I) freedom of rudder movement;

(M) marshalling signals;

(N) instrument checks;

(O) air traffic control procedures (if applicable).

(v) Exercise 3e: Emergencies: brake and steering failure.

(vi) Exercise 4: Straight and level:

(A) at normal cruising power, attaining and maintaining straight and level flight;

(B) flight at critically high air speeds;

(C) demonstration of inherent stability;

(D) control in pitch, including use of trim;

(E) lateral level, direction and balance and trim;

(F) at selected air speeds (use of power);

(G) during speed and configuration changes;

(H) use of instruments for precision.

(vii) Exercise 5: Climbing:

(A) entry, maintaining the normal and max rate climb and levelling off;

(B) levelling off at selected altitudes;

(C) en-route climb (cruise climb);

(D) climbing with flap down;

(E) recovery to normal climb;

(F) maximum angle of climb;

(G) use of instruments for precision.

(viii) Exercise 6: Descending:

(A) entry, maintaining and levelling off;

(B) levelling off at selected altitudes;

(C) glide, powered and cruise descent (including effect of power and air speed);

(D) side slipping (on suitable types);

(E) use of instruments for precision flight.

(ix) Exercise 7: Turning:

(A) entry and maintaining medium level turns;

(B) resuming straight flight;

(C) faults in the turn (incorrect pitch, bank and balance);

(D) climbing turns;

(E) descending turns;

(F) slipping turns (on suitable types);

(G) turns onto selected headings, use of gyro heading indicator or compass;

(H) use of instruments for precision.

(x) Exercise 8a: Slow flight:

Note: the objective is to improve the pilot's ability to recognise inadvertent flight at critically low speeds and provide practice in maintaining the TMG in balance while returning to normal air speed.

(A) safety checks;

(B) introduction to slow flight;

(C) controlled flight down to critically slow air speed;

(D) application of full power with correct attitude and balance to achieve normal climb speed.

(xi) Exercise 8b: Stalling:

(A) airmanship;

(B) safety checks;

(C) symptoms;

(D) recognition;

(E) clean stall and recovery without power and with power;

(F) recovery when a wing drops;

(G) approach to stall in the approach and in the landing configurations, with and without power, recovery at the incipient stage.

(xii) Exercise 9: Take-off and climb to downwind position:

(A) pre-take-off checks;

(B) into wind take-off;

(C) safeguarding the nose wheel (if applicable);

(D) crosswind take-off;

(E) drills during and after take-off;

(F) short take-off and soft field procedure or techniques performance calculations; including

(G) noise abatement procedures.

(xiii) Exercise 10: Circuit, approach and landing:

(A) circuit procedures, downwind and base leg;

(B) powered approach and landing;

(C) safeguarding the nose wheel (if applicable);

(D) effect of wind on approach and touchdown speeds;

(E) use of airbrakes, flaps, slats or spoilers;

(F) crosswind approach and landing;

(G) glide approach and landing (engine stopped);

(H) short landing and soft field procedures or techniques;

(I) flapless approach and landing (if applicable);

(J) wheel landing (tail wheel aeroplanes);

(K) missed approach and go-around;

(L) noise abatement procedures.

(xiv) Exercise 9/10e: Emergencies:

(A) abandoned take-off;

(B) engine failure after take-off;

(C) mislanding and go-around;

(D) missed approach.

Note: in the interests of safety it will be necessary for pilots trained on nose wheel TMGs to undergo dual conversion training before flying tail wheel TMGs, and vice versa.

(xv) Exercise 11: Advanced turning:

(A) steep turns (45 °), level and descending;

(B) stalling in the turn and recovery;

(C) recoveries from unusual attitudes, including spiral dives.

(xvi) Exercise 12: Stopping and restarting the engine:

(A) engine cooling procedures;

(B) switching off procedure in-flight;

(C) sailplane operating procedures;

(D) restarting procedure.

(xvii) Exercise 13: Forced landing without power:

(A) forced landing procedure;

(B) choice of landing area, provision for change of plan;

(C) gliding distance;

(D) descent plan;

(E) key positions;

(F) engine failure checks;

(G) use of radio;

(H) base leg;

(I) final approach;

(J) landing;

(K) actions after landing.

(xviii) Exercise 14: Precautionary landing:

(A) full procedure away from aerodrome to break-off height;

(B) occasions necessitating;

(C) in-flight conditions;

(D) landing area selection:

(a) normal aerodrome;

(b) disused aerodrome;

(c) ordinary field.

(E) circuit and approach;

(F) actions after landing.

(xix) Exercise 15a: Navigation

(A) Flight planning

(a) weather forecast and actuals;

(b) map selection and preparation:

(1) choice of route;

(2) airspace structure;

(3) safety altitudes.

(c) calculations:

(1) magnetic heading(s) and time(s) en-route;

(2) fuel consumption;

(3) mass and balance;

(4) mass and performance.

(d) flight information:

(1) NOTAMs, etc.;

(2) radio frequencies;

(3) selection of alternate aerodromes.

(e) TMG documentation;

(f) notification of the flight:

(1) pre-flight administrative procedures;

(2) flight plan form.

(B) Departure:

(a) organisation of cockpit workload;

(b) departure procedures:

(1) altimeter settings;

(2) ATC liaison in regulated airspace;

(3) setting heading procedure;

(4) noting of ETAs.

(C) En-route:

(a) maintenance of altitude and heading;

(b) revisions of ETA and heading;

(c) log keeping;
(d) use of radio or compliance with ATC procedures;
(e) minimum weather conditions for continuation of flight;
(f) in-flight decisions;
(g) transiting controlled or regulated airspace;
(h) diversion procedures;
(i) uncertainty of position procedure;
(j) lost procedure.

(D) Arrival, aerodrome joining procedure:
(a) ATC liaison in regulated airspace;
(b) altimeter setting;
(c) entering the traffic pattern;
(d) circuit procedures;
(e) parking;
(f) security of TMG;
(g) refuelling;
(h) closing of flight plan, if appropriate;
(i) post-flight administrative procedures.

(xx) Exercise 15b: Navigation problems at lower levels and in reduced visibility:
(A) actions before descending;
(B) hazards (for example obstacles and terrain);
(C) difficulties of map reading;
(D) effects of wind and turbulence;
(E) vertical situational awareness (avoidance of controlled flight into terrain);
(F) avoidance of noise sensitive areas;
(G) joining the circuit;
(H) bad weather circuit and landing.

(xxi) Exercise 15c: Radio navigation (basics):
(A) Use of GNSS or VOR/NDB;
(a) selection of waypoints;
(b) to or from indications or orientation;
(c) error messages.
(B) Use of VHF/DF:
(a) availability, AIP and frequencies;
(b) R/T procedures and ATC liaison;
(c) obtaining a QDM and homing.
(C) Use of en-route or terminal radar:

(a) availability and AIP;

(b) procedures and ATC liaison;

(c) pilot's responsibilities;

(d) secondary surveillance radar;

(1) transponders;

(2) code selection;

(3) interrogation and reply.

AMC1 FCL.110.B LAPL(B) Experience requirements and crediting

Crediting: pre-entry flight test

The pre-entry flight test referred to in FCL.110.B (b) should cover the total content of the syllabus of flight instruction for the issuance of the LAPL(B), in accordance with AMC1 FCL.110.B and FCL.210.B.

AMC1 FCL.110.B; FCL.210.B

Flight instruction for the LAPL(B) and flight instruction for the BPL

(a) Entry to training

Before being accepted for training an applicant should be informed that the appropriate medical certificate must be obtained before solo flying is permitted.

(b) Flight instruction

(1) The LAPL(B) or BPL flight instruction syllabus should take into account the principles of threat and error management and also cover:

(i) pre-flight operations, including load calculations, balloon inspection and servicing;

(ii) crew and passenger briefings;

(iii) inflation and crowd control;

(iv) control of the balloon by external visual reference;

(v) take-off in different wind conditions;

(vi) approach from low and high level;

(vii) landings in different surface wind conditions;

(viii) cross-country flying using visual reference and dead reckoning;

(ix) emergency operations, including simulated balloon equipment malfunctions;

(x) compliance with air traffic services procedures and communication procedures;

(xi) avoidance of nature protection areas, landowner relations.

(2) Before allowing the applicant to undertake his/her first solo flight, the FI should ensure that the applicant can operate the required systems and equipment.

(c) Syllabus of flight instruction (hot-air balloon)

(1) 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:

(i) the applicant's progress and ability;

(ii) the weather conditions affecting the flight;

(iii) the flight time available;

(iv) instructional technique considerations;

(v) the local operating environment;

(vi) applicability of the exercises to the balloon type.

(2) Each of the exercises involves the need for the applicant to be aware of the needs of good airmanship and look-out, which should be emphasised at all times.

(i) Exercise 1: Familiarisation with the balloon:

(A) characteristics of the balloon;

(B) the components or systems;

(C) re-fuelling of the cylinders;

(D) instruments and equipment;

(E) use of checklist(s) and procedures.

(ii) Exercise 2: Preparation for flight:

(A) documentation and equipment;

(B) weather forecast and actuals;

(C) flight planning:

(a) NOTAMs

(b) airspace structure;

(c) sensitive areas (for example nature protection areas);

(d) expected track and distance;

(e) pre-flight picture;

(f) possible landing fields.

(D) launch field:

(a) permission;

(b) field selection;

(c) behaviour;

(d) adjacent fields.

(E) load calculations.

(iii) Exercise 3: Crew and passenger briefing:

(A) clothing;

(B) crew briefing;

(C) passenger briefing.

(iv) Exercise 4: Assembly and layout:

(A) crowd control;

(B) rigging envelope, basket and burner;

(C) burner test;

(D) use of restraint line;

(E) pre-inflation checks.

(v) Exercise 5: Inflation:

(A) crowd control;

(B) cold inflation;

(C) use of the inflation fan;

(D) hot inflation.

(vi) Exercise 6: Take-off in different wind conditions:

(A) pre take-off checks and briefings;

(B) heating for controlled climb;

(C) ‘hands off and hands on' procedure for ground crew;

(D) assessment of lift;

(E) use of quick release;

(F) assessment of wind and obstacles;

(G) take-off in wind without shelter obstacles;

(H) preparation for false lift.

(vii) Exercise 7: Climb to level flight:

(A) climbing with a predetermined rate of climb;

(B) look-out procedures;

(C) effect on envelope temperature;

(D) maximum rate of climb according to manufacturer’s flight manual;

(E) levelling off at selected altitude.

(viii) Exercise 8: Level flight:

(A) maintaining level flight by:

(a) use of instruments only;

(b) use of visual references only;

(c) all available means.

(B) use of parachute and turning vents (if applicable).

(ix) Exercise 9: Descent to level flight:

(A) descent with a predetermined rate of descent;

(B) fast descent;

(C) look-out procedures;

(D) maximum rate of descent according to manufacturer’s flight manual;

(E) use of parachute;

(F) parachute stall;

(G) cold descent;

(H) levelling off at selected altitude.

(x) Exercise 10: Emergencies – systems:

(A) pilot light failure;

(B) burner failure, valve leaks, flame out and re-light;

(C) gas leaks;

(D) envelope over temperature;

(E) envelope damage in-flight;

(F) parachute or rapid deflation system failure.

(xi) Exercise 10B: Other emergencies:

(A) fire extinguisher;

(B) fire on ground;

(C) fire in the air;

(D) contact with electrical power lines;

(E) obstacle avoidance;

(F) escape drills, location and use of emergency equipment.

(xii) Exercise 11: Navigation:

(A) maps selection;

(B) plotting expected track;

(C) marking positions and time;

(D) calculation of distance, speed and fuel consumption;

(E) ceiling limitations (ATC, weather and envelope temperature);

(F) planning ahead;

(G) monitoring of weather development and acting so;

(H) monitoring of fuel consumption and envelope temperature;

(I) ATC liaison (if applicable);

(J) communication with retrieve crew;

(K) use of GNSS (if applicable).

(xiii) Exercise 12: Fuel management:

(A) cylinder arrangement and burner systems;

(B) pilot light supply (vapour or liquid);

(C) use of master cylinders (if applicable);

(D) fuel requirement and expected fuel consumption;

(E) fuel state and pressure;

(F) fuel reserves;

(G) cylinder contents gauge and change procedure;

(H) use of cylinder manifolds.

(xiv) Exercise 13: Approach from low level:

(A) pre-landing checks;

(B) passenger pre-landing briefing;

(C) selection of field;

(D) use of burner and parachute;

(E) look-out procedures;

(F) missed approach and fly on.

(xv) Exercise 14: Approach from high level:

(A) pre-landing checks;

(B) passenger pre-landing briefing;

(C) selection of field;

(D) rate of descent;

(E) use of burner and parachute;

(F) look-out procedures;

(G) missed approach and fly on.

(xvi) Exercise 15: Operating at low level:

(A) use of burner, whisper burner and parachute;

(B) look-out procedures;

(C) avoidance of low level obstacles;

(D) avoidance of protection areas;

(E) landowner relations.

(xvii) Exercise 16: Landing in different wind conditions:

(A) pre-landing checks;

(B) passenger pre-landing briefing;

(C) selection of field;

(D) turbulences (in the case of landings with high wind speed only);

(E) use of burner and pilot lights;

(F) use of parachute and turning vents (if applicable);

(G) look-out procedures;

(H) dragging and deflation;

(I) landowner relations;

(J) airmanship.

(xviii) Exercise 17: First solo:

(A) supervised flight preparation;

(B) instructor's briefing, observation of flight and de-briefing.

Syllabus of flight instruction (gas balloon)

(1) 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:

(i) the applicant's progress and ability;

(ii) the weather conditions affecting the flight;

(iii) the flight time available;

(iv) instructional technique considerations;

(v) the local operating environment;

(vi) applicability of the exercises to the balloon type.

(2) Each of the exercises involves the need for the pilot-under-training to be aware of the needs of good airmanship and look-out, which should be emphasised at all times.

(i) Exercise 1: Familiarisation with the balloon:

(A) characteristics of the balloon;

(B) the components or systems;

(C) instruments and equipment;

(D) use of checklist(s) and procedures.

(ii) Exercise 2: Preparation for flight:

(A) documentation and equipment

(B) weather forecast and actuals;

(C) flight planning:

(a) NOTAMs;

(b) airspace structure;

(c) sensitive areas (for example nature protection areas);

(d) expected track and distance;

(e) pre-flight picture;

(f) possible landing fields.

(D) launch field:

(a) permission;

(b) behaviour;

(c) adjacent fields.

(E) load calculations.

(iii) Exercise 3: Crew and passenger briefing:

(A) clothing;

(B) crew briefings;

(C) passenger briefing.

(iv) Exercise 4: Assembly and layout:

(A) crowd control;

(B) rigging envelope and basket (balloon with net);

(C) rigging envelope and basket (netless balloon);

(D) ballast check.

(A) map selection;

(B) plotting expected track;

(C) marking positions and time;

(D) calculation of distance, speed and ballast consumption;

(E) ceiling limitations (ATC, weather and ballast);

(F) planning ahead;

(G) monitoring of weather development and acting so;

(H) monitoring of ballast consumption;

(I) ATC liaison (if applicable);

(J) communication with retrieve crew;

(K) use of GNSS (if applicable).

(v) Exercise 12: Ballast management:

(A) minimum ballast;

(B) arrangement and securing of ballast;

(C) ballast requirement and expected ballast consumption;

(D) ballast reserves.

(vi) Exercise 13: Approach from low level:

(A) pre-landing checks;

(B) passenger pre-landing checks;

(C) selection of field;

(D) use of ballast and parachute or valve;

(E) use of trail rope (if applicable);

(F) look-out procedures;

(G) missed approach and fly on.

(vii) Exercise 14: Approach from high level:

(A) pre-landing checks;

(B) passenger pre-landing checks;

(C) selection of field;

(D) rate of descent;

(E) use of ballast and parachute or valve;

(F) use of trail rope (if applicable);

(G) look-out procedures;

(H) missed approach and fly on.

(viii) Exercise 15: Operating at low level:

(A) use of ballast and parachute or valve;

(B) look-out procedures;

(C) avoidance of low level obstacle;

(D) avoidance of protection areas;

(E) landowner relations.

(ix) Exercise 16: Landing in different wind conditions:

(A) pre-landing checks;

(B) passenger pre-landing briefing;

(C) selection of field;

(D) turbulences (in the case of landings with high wind speed only);

(E) use of ballast and parachute or valve;

(F) look-out procedures;

(G) use of rip panel;

(H) dragging;

(I) deflation;

(J) avoiding electrostatic discharge;

(K) landowner relations.

(x) Exercise 17: First solo:

Note: the exercises 1 to 16 have to be completed and the student must have achieved a safe and competent level before the first solo flight takes place.

(A) supervised flight preparation;

(B) instructor's briefing, observation of flight and de-briefing.

AMC1 FCL.130.B; FCL.220.B

Flight instruction for the extension of privileges to tethered flights

(a) The aim of the flight instruction is to qualify LAPL(B) or BPL holders to perform tethered flights.

(b) The flying exercise should cover the following training items:

(1) ground preparations;

(2) weather suitability;

(3) tether points:

(i) upwind;

(ii) downwind.

(4) tether ropes (three point system);

(5) maximum all-up-weight limitation;

(6) crowd control;

(7) pre take-off checks and briefings;

(8) heating for controlled lift off;

(9) 'hands off and hands on' procedure for ground crew;

(10) assessment of lift;

(11) assessment of wind and obstacles;

(12) take-off and controlled climb (at least up to 60 ft – 20m).

AMC1 FCL.135.B; FCL.225.B

Theoretical knowledge instruction for the extension to another balloon class: LAPL(B) and BPL

(a) The aim of the flight instruction is to qualify LAPL(B) or BPL holders to exercise the privileges on a different class of balloons.

(b) The following classes are recognised:

(1) hot-air balloons;

(2) gas balloons;

(3) hot-air airships.

(c) The ATO should issue a certificate of satisfactory completion of the instruction to licence endorsement.

(d) Theoretical knowledge

The theoretical knowledge syllabus should cover the revision or explanation of:

(1) principles of flight:

(i) operating limitations;

(ii) loading limitations.

(2) operational procedures:

(i) special operational procedures and hazards;

(ii) emergency procedures.

(3) flight performance and planning:

(i) mass considerations;

(ii) loading;

(iii) performance (hot-air balloon, gas balloon or hot-air airship);

(iv) flight planning;

(v) fuel planning;

(vi) flight monitoring.

(4) aircraft general knowledge:

(i) system designs, loads, stresses and maintenance;

(ii) envelope;

(iii) burner (only extension to hot-air balloon or airship);

(iv) fuel cylinders (except gas balloon);

(v) basket or gondola;

(vi) lifting or burning gas;

(vii) ballast (only gas balloon);

(viii) engine (only hot-air airship);

(ix) instruments and indication systems;

(x) emergency equipment.

AMC2 FCL.135.B; FCL.225.B

Flight instruction for the extension to another balloon class: LAPL(B) and BPL

(a) This additional syllabus of flight instruction should be used for the extension of privileges for LAPL(B) and BPL - hot-air balloon to hot-air airship.

(b) The prerequisite for the extension of privileges to hot-air airships is a valid BPL or LAPL for hot-air balloons because a hot-air airship with a failed engine must be handled in a similar manner as a hot-air balloon. The conversion training has to concentrate therefore on the added complication of the engine, its controls and the different operating limitations of a hot-air airship.

(1) 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.

(2) The flying exercises should cover the revision or explanation of the following exercises:

(i) Exercise 1: Familiarisation with the hot-air airship:

(A) characteristics of the hot-air airship;

(B) the components or systems;

(C) instruments and equipment;

(D) use of checklist(s) and procedures.

(ii) Exercise 2: Preparation for flight:

(A) documentation and equipment;

(B) weather forecast and actuals;

(C) flight planning:

(a) NOTAMs;

(b) airspace structure;

(c) sensitive areas;

(d) expected track and distance;

(e) pre-flight picture;

(f) possible landing fields.

(D) launch field:
  (a) permission;
  (b) behaviour;
  (c) field selection;
  (d) adjacent fields.
(E) load and fuel calculations.

(iii) Exercise 3: Crew and passenger briefing:
(A) clothing;
(B) crew briefing;
(C) passenger briefing.

(iv) Exercise 4: Assembly and layout:
(A) crowd control;
(B) rigging envelope, gondola, burner and engine;
(C) burner test;
(D) pre-inflation checks.

(v) Exercise 5: Inflation:
(A) crowd control;
(B) cold inflation:
  (a) use of restraint line;
  (b) use of the inflation fan.
(C) hot inflation.

(vi) Exercise 6: Engine:
(A) identification of main parts and controls;
(B) familiarisation with operation and checking of the engine;
(C) engine checks before take-off.

(vii) Exercise 7: Pressurisation:
(A) pressurisation fan operation;
(B) super pressure and balance between pressure and temperature;
(C) pressure limitations.

(viii) Exercise 8: Take-off:
(A) before take-off checks and briefings;
(B) heating for controlled climb;
(C) procedure for ground crew;
(D) assessment of wind and obstacles.

(ix) Exercise 9: Climb to level flight:
(A) climbing with a predetermined rate of climb;

(B) effect on envelope temperature and pressure;

(C) maximum rate of climb according to manufacturer's flight manual;

(D) level off at selected altitude.

(x) Exercise 10: Level flight:

(A) maintaining level flight by:

(a) use of instruments only;

(b) use of visual references only;

(c) all available means.

(B) maintaining level flight at different air speeds by taking aerodynamic lift into account.

(xi) Exercise 11: Descent to level flight:

(A) descent with a predetermined rate of descent;

(B) maximum rate of descent according to manufacturer's flight manual;

(C) levelling off at selected altitude.

(xii) Exercise 12: Emergencies - systems:

(A) engine failure;

(B) pressurisation failure;

(C) rudder failure;

(D) pilot light failure;

(E) burner failure, valve leaks, flame out and re-light;

(F) gas leaks;

(G) envelope over temperature;

(H) envelope damage in-flight.

(xiii) Exercise 12B: Other emergencies:

(A) fire extinguishers;

(B) fire on ground;

(C) fire in the air;

(D) contact with electrical power lines;

(E) obstacle avoidance;

(F) escape drills, location and use of emergency equipment.

(xiv) Exercise 13: Navigation:

(A) map selection and preparation;

(B) plotting and steering expected track;

(C) marking positions and time;

(D) calculation of distance, speed and fuel consumption;

(E) ceiling limitations (ATC, weather and envelope temperature);

(F) planning ahead;

(G) monitoring of weather development and acting so;

(H) monitoring of fuel and envelope temperature or pressure;

(I) ATC liaison (if applicable);

(J) communication with ground crew;

(K) use of GNSS (if applicable).

(xv) Exercise 14: Fuel management:

(A) engine arrangement and tank system;

(B) cylinder arrangement and burner systems;

(C) pilot light supply (vapour or liquid);

(D) fuel requirement and expected fuel consumption for engine and burner;

(E) fuel state and pressure;

(F) fuel reserves;

(G) cylinder and petrol tank contents gauge.

(xvi) Exercise 15: Approach and go-around:

(A) pre-landing checks;

(B) selection of field into wind;

(C) use of burner and engine;

(D) look-out procedures;

(E) missed approach and go-around.

(xvii) Exercise 16: Approach with simulated engine failure:

(A) pre-landing checks;

(B) selection of field;

(C) use of burner;

(D) look-out procedures;

(E) missed approach and go-around.

(xviii) Exercise 17: Operating at low level:

(A) use of burner and engine;

(B) look-out procedures;

(C) avoidance of low level obstacles;

(D) avoidance of sensitive areas (nature protection areas) or landowner relations.

(xix) Exercise 18: Steering:

(A) assessment of wind;

(B) correcting for wind to steer a given course.

(xx) Exercise 19: Final landing:

(A) pre-landing checks;

(B) use of burner and engine;

(C) look-out;

(D) deflation;

(E) landowner relations.

AMC3 FCL.135.B; FCL.225.B

Contents of the skill test for the extension of a LAPL(B) or a BPL to another balloon class (hot-air airship)

(a) The take-off site should be chosen by the applicant depending on the actual meteorological conditions, the area which has to be overflown and the possible options for suitable landing sites. The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board.

(b) An applicant should indicate to the FE the checks and duties carried out. Checks should be completed in accordance with the flight manual or the authorised checklist for the balloon on which the test is being taken. During pre-flight preparation for the test the applicant should be required to perform crew and passenger briefings and demonstrate crowd control. The load calculation should be performed by the applicant in compliance with the operations manual or flight manual for the hot-air airship used.

Flight test tolerance

(c) The applicant should demonstrate the ability to:

(1) operate the hot-air airship within its limitations;

(2) complete all manoeuvres with smoothness and accuracy;

(3) exercise good judgment and airmanship;

(4) apply aeronautical knowledge;

(5) maintain control of the airship at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

Content of the skill test

(d) The skill test contents and sections set out in this AMC should be used for the skill test for the issue of a LAPL(B) and BPL hot-air airship extension.

SECTION 1 PRE-FLIGHT OPERATIONS, INFLATION AND TAKE-OFF	
Use of checklist, airmanship, control of hot-air airship by external visual reference, look-out procedures, etc. apply in all sections.	
a	Pre-flight documentation, flight planning, NOTAM and weather briefing
b	Hot-air airship inspection and servicing
c	Load calculation
d	Crowd control, crew and passenger briefings
e	Assembly and layout
f	Inflation and pre-take-off procedures

g	Take-off
h	ATC compliance (if applicable)
SECTION 2 GENERAL AIRWORK	
a	Climb to level flight
b	Level flight
c	Descent to level flight
d	Operating at low level
e	ATC compliance (if applicable)
SECTION 3 EN-ROUTE PROCEDURES	
a	Dead reckoning and map reading
b	Marking positions and time
c	Orientation and airspace structure
d	Plotting and steering expected track
e	Maintenance of altitude
f	Fuel management
g	Communication with ground crew
h	ATC compliance (if applicable)
SECTION 4 APPROACH AND LANDING PROCEDURES	
a	Approach, missed approach and go-around
b	Pre-landing checks
c	Selection of landing field
d	Landing and deflation
e	ATC compliance (if applicable)
f	Actions after flight
SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES	
This section may be combined with Sections 1 through 4	
a	Simulated fire on the ground and in the air
b	Simulated pilot light-, burner- and engine-failure
c	Approach with simulated engine failure, missed approach and go-around
d	Other abnormal and emergency procedures as outlined in the appropriate flight manual
e	Oral questions

AMC1 to FCL.140.A, FCL.140.H, FCL.140.S, FCL.140.B Recency requirements and FCL.740, Validity of class and type ratings

All hours flown on any aircraft registered in an ICAO member state should be counted in full towards fulfilling the hourly requirements as long as the aircraft match the definition and criteria of the respective Part FCL aircraft category and its class and type ratings.

Subpart C - Private Pilot Licence (PPL), Sailplane Pilot Licence (SPL) and Balloon Pilot Licence (BPL)

AMC1 FCL.210(c) Training course

CHANGE OF TRAINING ORGANISATION

In cases where the applicant completes the training course (theoretical knowledge instruction or flight instruction) at a different DTO or ATO ('completing training organisation') from the one where they have started the training course ('starting training organisation'), the applicant should request from the starting training organisation a copy of the records kept in accordance with point DTO.GEN.220 or point ORA.ATO.120

AMC1 FCL.210; FCL.215

Syllabus of theoretical knowledge for the PPL(A) and PPL(H)

The following tables contain the syllabi for the courses of theoretical knowledge, as well as for the theoretical knowledge examinations for the PPL(A) and PPL(H). The training and examination should cover aspects related to non-technical skills in an integrated manner, taking into account the particular risks associated to the licence and the activity. An approved course shall comprise at least 100 hours of theoretical knowledge instruction. This theoretical knowledge instruction provided by the ATO should include a certain element of formal classroom work but may include also such facilities as interactive video, slide or tape presentation, computer-based training and other media distance learning courses. The training organisation responsible for the training has to check if all the appropriate elements of the training course of theoretical knowledge instruction have been completed to a satisfactory standard before recommending the applicant for the examination.

The applicable items for each licence are marked with 'x'. An 'x' on the main title of a subject means that all the sub-divisions are applicable.

		Aeroplane		**Helicopter**	
		PPL	Bridge course	PPL	Bridge course
1.	**AIR LAW AND ATC PROCEDURES**				
	International law: conventions, agreements and organisations				
	The Convention on international civil aviation (Chicago) Doc. 7300/6				
	Part I Air Navigation: relevant parts of the following chapters: (a) general principles and application of the convention; (b) flight over territory of Contracting States; (c) nationality of aircraft; (d) measures to facilitate air navigation; (e) conditions to be fulfilled on aircraft; (f) international standards and recommended practices;	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	(g) validity of endorsed certificates and licences; (h) notification of differences.				
	Part II The International Civil Aviation Organisation (ICAO): objectives and composition	x		x	
	Annex 8: Airworthiness of aircraft				
	Foreword and definitions	x		x	
	Certificate of airworthiness	x		x	
	Annex 7: Aircraft nationality and registration marks				
	Foreword and definitions	x		x	
	Common- and registration marks	x		x	
	Certificate of registration and aircraft nationality	x		x	
	Annex 1: Personnel licensing				
	Definitions	x		x	
	Relevant parts of Annex 1 connected to Part- FCL and Part-Medical	x		x	
	Annex 2: Rules of the air				
	Essential definitions, applicability of the rules of the air, general rules (except water operations), visual flight rules, signals and interception of civil aircraft	x		x	
	Procedures for air navigation: aircraft operations doc. 8168-ops/611, volume 1				
	Altimeter setting procedures (including IACO doc. 7030 – regional supplementary procedures)				
	Basic requirements (except tables), procedures applicable to operators and pilots (except tables)	x		x	
	Secondary surveillance radar transponder operating procedures (including ICAO Doc. 7030 – regional supplementary procedures)				
	Operation of transponders	x		x	
	Phraseology	x		x	
	Annex 11: Doc. 4444 air traffic management				
	Definitions	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	General provisions for air traffic services	x		x	
	Visual separation in the vicinity of aerodromes	x		x	
	Procedures for aerodrome control services	x		x	
	Radar services	*x*		x	
	Flight information service and alerting service	x		x	
	Phraseologies	x		x	
	Procedures related to emergencies, communication failure and contingencies	x		x	
	Annex 15: Aeronautical information service				
	Introduction, essential definitions	x		x	
	AIP, NOTAM, AIRAC and AIC	x		x	
	Annex 14, volume 1 and 2: Aerodromes				
	Definitions	x		x	
	Aerodrome data: conditions of the movement area and related facilities	x		x	
	Visual aids for navigation: (a) indicators and signalling devices; (b) markings; (c) lights; (d) signs; (e) markers.	x		x	
	Visual aids for denoting obstacles: (a) marking of objects; (b) lighting of objects.	x		x	
	Visual aids for denoting restricted use of areas	x		x	
	Emergency and other services: (a) rescue and fire fighting; (b) apron management service.	x		x	
	Annex 12: Search and rescue				
	Essential definitions	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Operating procedures: (a) procedures for PIC at the scene of an accident; (b) procedures for PIC intercepting a distress transmission; (c) search and rescue signals.	x		x	
	Search and rescue signals: (a) signals with surface craft; (b) ground or air visual signal code; (c) air or ground signals.	x		x	
	Annex 17: Security				
	General: aims and objectives	x		x	
	Annex 13: Aircraft accident investigation				
	Essential definitions Applicability	x x		x x	
	National law				
	National law and differences to relevant ICAO Annexes and relevant EU regulations.	x		x	
2.	**HUMAN PERFORMANCE**				
	Human factors: basic concepts				
	Human factors in aviation				
	Becoming a competent pilot	x		x	
	Basic aviation physiology and health maintenance				
	The atmosphere: (a) composition; (b) gas laws.	x		x	
	Respiratory and circulatory systems: (a) oxygen requirement of tissues; (b) functional anatomy; (c) main forms of hypoxia (hypoxic and anaemic): (1) sources, effects and counter- measures of carbon monoxide; (2) counter measures and hypoxia; (3) symptoms of hypoxia.	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	(d) hyperventilation; (e) the effects of accelerations on the circulatory system; (f) hypertension and coronary heart disease.				
	Man and environment				
	Central, peripheral and autonomic nervous systems	x		x	
	Vision: (a) functional anatomy; (b) visual field, foveal and peripheral vision; (c) binocular and monocular vision; (d) monocular vision cues; (e) night vision; (f) visual scanning and detection techniques and importance of 'look-out'; (g) defective vision.	x		x	
	Hearing: (a) descriptive and functional anatomy; (b) flight related hazards to hearing; (c) hearing loss.	x		x	
	Equilibrium: (a) functional anatomy; (b) motion and acceleration; (c) motion sickness.	x		x	
	Integration of sensory inputs: (a) spatial disorientation: forms, recognition and avoidance;	x		x	
	(b) illusions: forms, recognition and avoidance: (1) physical origin; (2) physiological origin; (3) psychological origin. (c) approach and landing problems.				
	Health and hygiene				
	Personal hygiene: personal fitness	x		x	
	Body rhythm and sleep: (a) rhythm disturbances; (b) symptoms, effects and management.	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Problem areas for pilots: (a) common minor ailments including cold, influenza and gastro-intestinal upset; (b) entrapped gases and barotrauma, (scuba diving); (c) obesity; (d) food hygiene; (e) infectious diseases; (f) nutrition; (g) various toxic gases and materials.	x		x	
	Intoxication:	x		x	
	(a) prescribed medication; (b) tobacco; (c) alcohol and drugs; (d) caffeine; (e) self-medication.				
	Basic aviation psychology				
	Human information processing				
	Attention and vigilance: (a) selectivity of attention; (b) divided attention.	x		x	
	Perception: (a) perceptual illusions; (b) subjectivity of perception; (c) processes of perception.	x		x	
	Memory: (a) sensory memory; (b) working or short term memory; (c) long term memory to include motor memory (skills).	x		x	
	Human error and reliability				
	Reliability of human behaviour	x		x	
	Error generation: social environment (group, organisation)	x		x	
	Decision making				
	Decision-making concepts:	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	(a) structure (phases); (b) limits; (c) risk assessment; (d) practical application.				
	Avoiding and managing errors: cockpit management				
	Safety awareness: (a) risk area awareness; (b) situational awareness.	x		x	
	Communication: verbal and non-verbal communication	x		x	
	Human behaviour				
	Personality and attitudes: (a) development; (b) environmental influences.	x		x	
	Identification of hazardous attitudes (error proneness)	x		x	
	Human overload and underload				
	Arousal	x		x	
	Stress: (a) definition(s); (b) anxiety and stress; (c) effects of stress.	x		x	
	Fatigue and stress management: (a) types, causes and symptoms of fatigue; (b) effects of fatigue; (c) coping strategies; (d) management techniques; (e) health and fitness programmes;	x		x	
3.	**METEOROLOGY**				
	The atmosphere				
	Composition, extent and vertical division				
	Structure of the atmosphere	x		x	
	Troposphere	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Air temperature				
	Definition and units	x		x	
	Vertical distribution of temperature	x		x	
	Transfer of heat	x		x	
	Lapse rates, stability and instability	x		x	
	Development of inversions and types of inversions	x		x	
	Temperature near the earth's surface, surface effects, diurnal and seasonal variation, effect of clouds and effect of wind	x		x	
	Atmospheric pressure				
	Barometric pressure and isobars	x		x	
	Pressure variation with height	x		x	
	Reduction of pressure to mean sea level	x		x	
	Relationship between surface pressure centres and pressure centres aloft	x		x	
	Air density				
	Relationship between pressure, temperature and density	x		x	
	ISA				
	ICAO standard atmosphere	x		x	
	Altimetry				
	Terminology and definitions	x		x	
	Altimeter and altimeter settings	x		x	
	Calculations	x		x	
	Effect of accelerated airflow due to topography	x		x	
	Wind				
	Definition and measurement of wind				
	Definition and measurement	x		x	
	Primary cause of wind				

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Primary cause of wind, pressure gradient, coriolis force and gradient wind	x		x	
	Variation of wind in the friction layer	x		x	
	Effects of convergence and divergence	x		x	
4.	**COMMUNICATIONS**				
	VFR COMMUNICATIONS				
	Definitions				
	Meanings and significance of associated terms	x		x	
	ATS abbreviations	x		x	
	Q-code groups commonly used in RTF air- ground communications	x		x	
	Categories of messages	x		x	
	General operating procedures				
	Transmission of letters	x		x	
	Transmission of numbers (including level information)	x		x	
	Transmission of time	x		x	
	Transmission technique	x		x	
	Standard words and phrases (relevant RTF phraseology included)	x		x	
	R/T call signs for aeronautical stations including use of abbreviated call signs	x		x	
	R/T call signs for aircraft including use of abbreviated call signs	x		x	
	Transfer of communication	x		x	
	Test procedures including readability scale	x		x	
	Read back and acknowledgement requirements	x		x	
	Relevant weather information terms (VFR)				
	Aerodrome weather	x		x	
	Weather broadcast	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Action required to be taken in case of communication failure	x		x	
	Distress and urgency procedures				
	Distress (definition, frequencies, watch of distress frequencies, distress signal and distress message)	x		x	
	Urgency (definition, frequencies, urgency signal and urgency message)	x		x	
	General principles of VHF propagation and allocation of frequencies	x		x	
5.	**PRINCIPLES OF FLIGHT**				
5.1.	**PRINCIPLES OF FLIGHT: AEROPLANE**				
	Subsonic aerodynamics				
	Basics concepts, laws and definitions				
	Laws and definitions:	x	x		
	(a) conversion of units; (b) Newton´s laws; (c) Bernoulli's equation and venture; (d) static pressure, dynamic pressure and total pressure; (e) density; (f) IAS and TAS.				
	Basics about airflow: (a) streamline; (b) two-dimensional airflow; (c) three-dimensional airflow.	x	x		
	Aerodynamic forces on surfaces: (a) resulting airforce; (b) lift; (c) drag; (d) angle of attack.	x	x		
	Shape of an aerofoil section: (a) thickness to chord ratio; (b) chord line; (c) camber line;	x	x		

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	(d) camber; (e) angle of attack.				
	The wing shape: (a) aspect ratio; (b) root chord; (c) tip chord; (d) tapered wings; (e) wing planform.	x	x		
	The two-dimensional airflow about an aerofoil				
	Streamline pattern	x	x		
	Stagnation point	x	x		
	Pressure distribution	x	x		
	Centre of pressure	x	x		
	Influence of angle of attack	x	x		
	Flow separation at high angles of attack	x	x		
	The lift – α graph	x	x		
	The coefficients				
	The lift coefficient Cl: the lift formula	x	x		
	The drag coefficient Cd: the drag formula	x	x		
	The three-dimensional airflow round a wing and a fuselage				
	Streamline pattern: (a) span-wise flow and causes; (b) tip vortices and angle of attack; (c) upwash and downwash due to tip vortices; (d) wake turbulence behind an aeroplane (causes, distribution and duration of the phenomenon).	x	x		
	Induced drag: (a) influence of tip vortices on the angle of attack; (b) the induced local α; (c) influence of induced angle of attack on the direction of the lift vector; (d) induced drag and angle of attack.	x	x		

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Drag				
	The parasite drag: (a) pressure drag; (b) interference drag; (c) friction drag.	x	x		
	The parasite drag and speed	x	x		
	The induced drag and speed	x	x		
	The total drag	x	x		
	The ground effect				
	Effect on take-off and landing characteristics of an aeroplane	x	x		
	The stall				
	Flow separation at increasing angles of attack: (a) the boundary layer: (1) laminar layer; (2) turbulent layer; (3) transition. (b) separation point; (c) influence of angle of attack; (d) influence on: (1) pressure distribution; (2) location of centre of pressure; (3) CL; (4) CD; (5) pitch moments. (e) buffet; (f) use of controls.	x	x		
	The stall speed: (a) in the lift formula; (b) 1g stall speed; (c) influence of: (1) the centre of gravity; (2) power setting; (3) altitude (IAS);	x	x		

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	(4) wing loading; (5) load factor n: (i) definition; (ii) turns; (iii) forces.				
	The initial stall in span-wise direction: (a) influence of planform; (b) geometric twist (wash out); (c) use of ailerons.	x	x		
	Stall warning: (a) importance of stall warning; (b) speed margin; (c) buffet; (d) stall strip; (e) flapper switch; (f) recovery from stall.	x	x		
	Special phenomena of stall: (a) the power-on stall; (b) climbing and descending turns; (c) t-tailed aeroplane; (d) avoidance of spins: (1) spin development; (2) spin recognition; (3) spin recovery. (e) ice (in stagnation point and on surface): (1) absence of stall warning; (2) abnormal behaviour of the aircraft during stall.	x	x		
	C_L augmentation				
	Trailing edge flaps and the reasons for use in take-off and landing: (a) influence on C_L - α-graph; (b) different types of flaps; (c) flap asymmetry; (d) influence on pitch movement.	x	x		
	Leading edge devices and the reasons for use in take-off and landing	x	x		

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	The boundary layer				
	Different types: (a) laminar; (b) turbulent.	x	x		
	Special circumstances				
	Ice and other contamination: (a) ice in stagnation point; (b) ice on the surface (frost, snow and clear ice); (c) rain; (d) contamination of the leading edge; (e) effects on stall; (f) effects on loss of controllability; (g) effects on control surface moment; (h) influence on high lift devices during take- off, landing and low speeds.	x	x		
	Stability				
	Condition of equilibrium in steady horizontal flight				
	Precondition for static stability	x	x		
	Equilibrium: (a) lift and weight; (b) drag and thrust.	x	x		
	Methods of achieving balance				
	Wing and empennage (tail and canard)	x	x		
	Control surfaces	x	x		
	Ballast or weight trim	x	x		
	Static and dynamic longitudinal stability				
	Basics and definitions: (a) static stability, positive, neutral and negative; (b) precondition for dynamic stability; (c) dynamic stability, positive, neutral and negative.	x	x		
	Location of centre of gravity: (a) aft limit and minimum stability margin;	x	x		

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	(b) forward position; (c) effects on static and dynamic stability.				
	Dynamic lateral or directional stability				
	Spiral dive and corrective actions	x	x		
	Control				
	General				
	Basics, the three planes and three axis	x	x		
	Angle of attack change	x	x		
	Pitch control				
	Elevator	x	x		
	Downwash effects	x	x		
	Location of centre of gravity	x	x		
	Yaw control				
	Pedal or rudder	x	x		
	Roll control				
	Ailerons: function in different phases of flight	x	x		
	Adverse yaw	x	x		
	Means to avoid adverse yaw: (a) frise ailerons; (b) differential ailerons deflection.	x	x		
	Means to reduce control forces				
	Aerodynamic balance: (a) balance tab and anti-balance tab; (b) servo tab.	x	x		
	Mass balance				
	Reasons to balance: means	x	x		
	Trimming				
	Reasons to trim	x	x		

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Trim tabs	x	x		
	Limitations				
	Operating limitations				
	Flutter	x	x		
	V_{fe}	x	x		
	V_{no}, V_{ne}	x	x		
	Manoeuvring envelope				
	Manoeuvring load diagram: (a) load factor; (b) accelerated stall speed; (c) V_a; (d) manoeuvring limit load factor or certification category.	x	x		
	Contribution of mass	x	x		
	Gust envelope				
	Gust load diagram	x	x		
	Factors contributing to gust loads	x	x		
	Propellers				
	Conversion of engine torque to thrust				
	Meaning of pitch	x	x		
	Blade twist	x	x		
	Effects of ice on propeller	x	x		
	Engine failure or engine stop				
	Windmilling drag	x	x		
	Moments due to propeller operation				
	Torque reaction	x	x		
	Asymmetric slipstream effect	x	x		
	Asymmetric blade effect	x	x		
	Flight mechanics				

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Forces acting on an aeroplane				
	Straight horizontal steady flight	x	x		
	Straight steady climb	x	x		
	Straight steady descent	x	x		
	Straight steady glide	x	x		
	Steady coordinated turn: (a) bank angle; (b) load factor; (c) turn radius; (d) rate one turn.	x	x		
5.2.	**PRINCIPLES OF FLIGHT: HELICOPTER**				
	Subsonic aerodynamics				
	Basic concepts, laws and definitions			x	x
	Conversion of units			x	x
	Definitions and basic concepts about air: (a) the atmosphere and International Standard Atmosphere; (b) density; (c) influence of pressure and temperature on density.			x	x
	Newton's laws: (a) Newton's second law: Momentum equation; (b) Newton's third law: action and reaction.			x	x
	Basic concepts about airflow: (a) steady airflow and unsteady airflow; (b) Bernoulli's equation; (c) static pressure, dynamic pressure, total pressure and stagnation point; (d) TAS and IAS; (e) two-dimensional airflow and three- dimensional airflow; (f) viscosity and boundary layer.			x	x
	Two-dimensional airflow			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Aerofoil section geometry: (a) aerofoil section; (b) chord line, thickness and thickness to chord ratio of a section; (c) camber line and camber; (d) symmetrical and asymmetrical aerofoils sections.			x	x
	Aerodynamic forces on aerofoil elements: (a) angle of attack; (b) pressure distribution; (c) lift and lift coefficient (d) relation lift coefficient: angle of attack; (e) profile drag and drag coefficient; (f) relation drag coefficient: angle of attack; (g) resulting force, centre of pressure and pitching moment.			x	x
	Stall: (a) boundary layer and reasons for stalling; (b) variation of lift and drag as a function of angle of attack; (c) displacement of the centre of pressure and pitching moment.			x	x
	Disturbances due to profile contamination: (a) ice contamination; (b) ice on the surface (frost, snow and clear ice).			x	x
	The three-dimensional airflow round a wing and a fuselage			x	x
	The wing: (a) planform, rectangular and tapered wings; (b) wing twist.			x	x
	Airflow pattern and influence on lift: (a) span wise flow on upper and lower surface; (b) tip vortices; (c) span-wise lift distribution.			x	x
	Induced drag: causes and vortices			x	x
	The airflow round a fuselage: (a) components of a fuselage; (b) parasite drag; (c) variation with speed.			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Transonic aerodynamics and compressibility effects				
	Airflow velocities			x	x
	Airflow speeds: (a) speed of sound; (b) subsonic, high subsonic and supersonic flows.			x	x
	Shock waves: (a) compressibility and shock waves; (b) the reasons for their formation at upstream high subsonic airflow; (c) their effect on lift and drag.			x	x
	Influence of wing planform: sweep-angle			x	x
	Rotorcraft types			**x**	**x**
	Rotorcraft			x	x
	Rotorcraft types: (a) autogyro; (b) helicopter.			x	x
	Helicopters			x	x
	Helicopters configurations: the single main rotor helicopter			x	x
	The helicopter, characteristics and associated terminology: (a) general lay-out, fuselage, engine and gearbox; (b) tail rotor, fenestron and NOTAR; (c) engines (reciprocating and turbo shaft engines); (d) power transmission; (e) rotor shaft axis, rotor hub and rotor blades; (f) rotor disc and rotor disc area; (g) teetering rotor (two blades) and rotors with more than two blades; (h) skids and wheels; (i) helicopter axes and fuselage centre line; (j) roll axis, pitch axis and normal or yaw axis; (k) gross mass, gross weight and disc loading.			x	x
	Main rotor aerodynamics			**x**	**x**
	Hover flight outside ground effect			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Airflow through the rotor discs and round the blades: (a) circumferential velocity of the blade sections; (b) induced airflow, through the disc and downstream; (c) downward fuselage drag; (d) equilibrium of rotor thrust, weight and fuselage drag; (e) rotor disc induced power; (f) relative airflow to the blade; (g) pitch angle and angle of attack of a blade section; (h) lift and profile drag on the blade element; (i) resulting lift and thrust on the blade and rotor thrust; (j) collective pitch angle changes and necessity of blade feathering; (k) required total main rotor-torque and rotor-power; (l) influence of the air density.			x	x
	Anti-torque force and tail rotor: (a) force of tail rotor as a function of main rotor-torque; (b) anti-torque rotor power; (c) necessity of blade feathering of tail rotor blades and yaw pedals.			x	x
	Maximum hover altitude OGE: (a) total power required and power available; (b) maximum hover altitude as a function of pressure altitude and OAT.			x	x
	Vertical climb			x	x
	Relative airflow and angles of attack:			x	x
	(a) climb velocity V_C, induced and relative velocity and angle of attack; (b) collective pitch angle and blade feathering.				
	Power and vertical speed: (a) induced power, climb power and profile power; (b) total main rotor power and main rotor torque; (c) tail rotor power; (d) total power requirement in vertical flight.			x	x
	Forward flight			x	x
	Airflow and forces in uniform inflow distribution:			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	(a) assumption of uniform inflow distribution on rotor disc; (b) advancing blade (90°) and retreating blade (270°); (c) airflow velocity relative to the blade sections, area of reverse flow; (d) lift on the advancing and retreating blades at constant pitch angles; (e) necessity of cyclic pitch changes; (f) compressibility effects on the advancing blade tip and speed limitations; (g) high angle of attack on the retreating blade, blade stall and speed limitations; (h) thrust on rotor disc and tilt of thrust vector; (i) vertical component of the thrust vector and gross weight equilibrium; (j) horizontal component of the thrust vector and drag equilibrium.				
	The flare (power flight): (a) thrust reversal and increase in rotor thrust; (b) increase of rotor RPM on non-governed rotor.			x	x
	Power and maximum speed: (a) induced power as a function of helicopter speed; (b) rotor profile power as a function of helicopter speed; (c) fuselage drag and parasite power as a function of forward speed; (d) tail rotor power and power ancillary equipment; (e) total power requirement as a function of forward speed; (f) influence of helicopter mass, air density and drag of additional external equipment; (g) translational lift and influence on power required.			x	x
	Hover and forward flight in ground effect			x	x
	Airflow in ground effect and downwash: rotor power decrease as a function of rotor height above the ground at constant helicopter mass			x	x
	Vertical descent			x	x
	Vertical descent, power on: (a) airflow through the rotor, low and moderate descent speeds; (b) vortex ring state, settling with power and consequences.			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Autorotation: (a) collective lever position after failure; (b) up flow through the rotor, auto-rotation and anti-autorotation rings; (c) tail rotor thrust and yaw control; (d) control of rotor RPM with collective lever; (e) landing after increase of rotor thrust by pulling collective and reduction in vertical speed.			x	x
	Forward flight: Autorotation			x	x
	Airflow through the rotor disc: (a) descent speed and up flow through the disc; (b) the flare, increase in rotor thrust, reduction of vertical speed and ground speed.			x	x
	Flight and landing: (a) turning; (b) flare; (c) autorotative landing; (d) height or velocity avoidance graph and dead man's curve.			x	x
	Main rotor mechanics			**x**	**x**
	Flapping of the blade in hover			x	x
	Forces and stresses on the blade: (a) centrifugal force on the blade and attachments; (b) limits of rotor RPM; (c) lift on the blade and bending stresses on a rigid attachment; (d) the flapping hinge of the articulated rotor and flapping hinge offset; (e) the flapping of the hinge less rotor and flexible element.			x	x
	Coning angle in hover: (a) lift and centrifugal force in hover and blade weight negligible (b) flapping, tip path plane and disc area.			x	x
	Flapping angles of the blade in forward flight			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Forces on the blade in forward flight without cyclic feathering: (a) aerodynamic forces on the advancing and retreating blades without cyclic feathering; (b) periodic forces and stresses, fatigue and flapping hinge; (c) phase lag between the force and the flapping angle (about 90°); (d) flapping motion of the hinged blades and tilting of the cone and flap back of rotor; (e) rotor disc attitude and thrust vector tilt.			x	x
	Cyclic pitch (feathering) in helicopter mode, forward flight: (a) necessity of forward rotor disc tilt and thrust vector tilt; (b) flapping and tip path plane, virtual rotation axis or no flapping axis and plane of rotation; (c) shaft axis and hub plane; (d) cyclic pitch change (feathering) and rotor thrust vector tilt; (e) collective pitch change, collective lever, swash plate, pitch link and pitch horn; (f) cyclic stick, rotating swash plate and pitch link movement and phase angle.			x	x
	Blade lag motion			x	x
	Forces on the blade in the disc plane (tip path plane) in forward flight: (a) forces due to the Coriolis effect because of the flapping; (b) alternating stresses and the need of the drag or lag hinge.			x	x
	The drag or lag hinge: (a) the drag hinge in the fully articulated rotor; (b) the lag flexure in the hinge less rotor; (c) drag dampers.			x	x
	Ground resonance: (a) blade lag motion and movement of the centre of gravity of the blades and the rotor; (b) oscillating force on the fuselage; (c) fuselage, undercarriage and resonance.			x	x
	Rotor systems			x	x
	See-saw or teetering rotor			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Fully articulated rotor: (a) three hinges arrangement; (b) bearings and elastomeric hinges.			x	x
	Hinge less rotor and bearing less rotor			x	x
	Blade sailing: (a) low rotor RPM and effect of adverse wind; (b) minimising the danger; (c) droop stops.			x	x
	Vibrations due to main rotor: (a) origins of the vibrations: in plane and vertical; (b) blade tracking and balancing.			x	x
	Tail rotors			**x**	**x**
	Conventional tail rotor			x	x
	Rotor description: (a) two-blades tail rotors with teetering hinge; (b) rotors with more than two blades; (c) feathering bearings and flapping hinges; (d) dangers to people and to the tail rotor, rotor height and safety.			x	x
	Aerodynamics: (a) induced airflow and tail rotor thrust; (b) thrust control by feathering, tail rotor drift and roll; (c) effect of tail rotor failure and vortex ring.			x	x
	The fenestron: technical lay-out			x	x
	The NOTAR: technical lay-out			x	x
	Vibrations: high frequency vibrations due to the tail rotors			x	x
	Equilibrium, stability and control			**x**	**x**
	Equilibrium and helicopter attitudes			x	x
	Hover: (a) forces and equilibrium conditions; (b) helicopter pitching moment and pitch angle; (c) helicopter rolling moment and roll angle.			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Forward flight: (a) forces and equilibrium conditions; (b) helicopter moments and angles; (c) effect of speed on fuselage attitude.			x	x
	Control			x	x
	Control power			x	x
	(a) fully articulated rotor; (b) hinge less rotor; (c) teetering rotor.				
	Static and dynamic roll over			x	x
	Helicopter performances				
	Engine performances			x	x
	Piston engines: (a) power available; (b) effects of density altitude.			x	x
	Turbine engines: (a) power available; (b) effects of ambient pressure and temperature.			x	x
	Helicopter performances			x	x
	Hover and vertical flight: (a) power required and power available; (b) OGE and IGE maximum hover height; (c) influence of AUM, pressure, temperature and density.			x	x
	Forward flight: (a) maximum speed; (b) maximum rate of climb speed; (c) maximum angle of climb speed; (d) range and endurance; (e) influence of AUM, pressure, temperature and density.			x	x
	Manoeuvring: (a) load factor; (b) bank angle and number of g's;			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	(c) manoeuvring limit load factor.				
	Special conditions: (a) operating with limited power; (b) over pitch and over torque.			x	x
6.	**OPERATIONAL PROCEDURES**				
	General				
	Operation of aircraft: ICAO Annex 6, General requirements				
	Definitions	x	x	x	x
	Applicability	x	x	x	x
	Special operational procedures and hazards (general aspects)	x	x	x	x
	Noise abatement				
	Noise abatement procedures	x	x	x	x
	Influence of the flight procedure (departure, cruise and approach)	x	x	x	x
	Runway incursion awareness (meaning of surface markings and signals)	x	x	x	x
	Fire or smoke				
	Carburettor fire	x	x	x	x
	Engine fire	x	x	x	x
	Fire in the cabin and cockpit, (choice of extinguishing agents according to fire classification and use of the extinguishers)	x	x	x	x
	Smoke in the cockpit and (effects and action to be taken) and smoke in the cockpit and cabin (effects and actions taken)	x	x	x	x
	Windshear and microburst				
	Effects and recognition during departure and approach	x	x	x	x
	Actions to avoid and actions taken during encounter	x	x	x	x
	Wake turbulence				
	Cause	x	x	x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	List of relevant parameters	x	x	x	x
	Actions taken when crossing traffic, during take-off and landing	x	x	x	x
	Emergency and precautionary landings				
	Definition	x	x	x	x
	Cause	x	x	x	x
	Passenger information	x	x	x	x
	Evacuation	x	x	x	x
	Action after landing	x	x	x	x
	Contaminated runways				
	Kinds of contamination	x	x		
	Estimated surface friction and friction coefficient	x	x		
	Rotor downwash			x	x
	Operation influence by meteorological conditions (helicopter)				
	White out, sand or dust			x	x
	Strong winds			x	x
	Mountain environment			x	x
	Emergency procedures				
	Influence by technical problems				
	Engine failure			x	x
	Fire in cabin, cockpit or engine			x	x
	Tail, rotor or directional control failure			x	x
	Ground resonance			x	x
	Blade stall			x	x
	Settling with power (vortex ring)			x	x
	Overpitch			x	x
	Overspeed: rotor or engine			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Dynamic rollover			x	x
	Mast bumping			x	x
7.	**FLIGHT PERFORMANCE AND PLANNING**				
7.1.	**MASS AND BALANCE: AEROPLANES OR HELICOPTERS**				
	Purpose of mass and balance considerations				
	Mass limitations				
	Importance in regard to structural limitations	x	x	x	x
	Importance in regard to performance limitations	x	x	x	x
	CG limitations				
	Importance in regard to stability and controllability	x	x	x	x
	Importance in regard to performance	x	x	x	x
	Loading				
	Terminology				
	Mass terms	x	x	x	x
	Load terms (including fuel terms)	x	x	x	x
	Mass limits				
	Structural limitations	x	x	x	x
	Performance limitations	x	x	x	x
	Baggage compartment limitations	x	x	x	x
	Mass calculations				
	Maximum masses for take-off and landing	x	x	x	x
	Use of standard masses for passengers, baggage and crew	x	x	x	x
	Fundamentals of CG calculations				
	Definition of centre of gravity	x	x	x	x
	Conditions of equilibrium (balance of forces and balance of moments)	x	x	x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Basic calculations of CG	x	x	x	x
	Mass and balance details of aircraft				
	Contents of mass and balance documentation				
	Datum and moment arm	x	x	x	x
	CG position as distance from datum	x	x	x	x
	Extraction of basic mass and balance data from aircraft documentation				
	BEM	x	x	x	x
	CG position or moment at BEM	x	x	x	x
	Deviations from standard configuration	x	x	x	x
	Determination of CG position				
	Methods				
	Arithmetic method	x	x	x	x
	Graphic method	x	x	x	x
	Load and trim sheet				
	General considerations	x	x	x	x
	Load sheet and CG envelope for light aeroplanes and for helicopters	x	x	x	x
7.2.	**PERFORMANCE: AEROPLANES**				
	Introduction				
	Performance classes	x	x		
	Stages of flight	x	x		
	Effect of aeroplane mass, wind, altitude, runway slope and runway conditions	x	x		
	Gradients	x	x		
	SE aeroplanes				
	Definitions of terms and speeds	x	x		
	Take-off and landing performance				

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Use of aeroplane flight manual data	x	x		
	Climb and cruise performance				
	Use of aeroplane flight data	x	x		
	Effect of density altitude and aeroplane mass	x	x		
	Endurance and the effects of the different recommended power or thrust settings	x	x		
	Still air range with various power or thrust settings	x	x		
7.3.	**FLIGHT PLANNING AND FLIGHT MONITORING**				
	Flight planning for VFR flights				
	VFR navigation plan				
	Routes, airfields, heights and altitudes from VFR charts	x	x	x	x
	Courses and distances from VFR charts	x	x	x	x
	Aerodrome charts and aerodrome directory	x	x	x	x
	Communications and radio navigation planning data	x	x	x	x
	Completion of navigation plan	x	x	x	x
	Fuel planning				
	General knowledge	x	x	x	x
	Pre-flight calculation of fuel required				
	Calculation of extra fuel	x	x	x	x
	Completion of the fuel section of the navigation plan (fuel log) and calculation of total fuel	x	x	x	x
	Pre-flight preparation				
	AIP and NOTAM briefing				
	Ground facilities and services	x	x	x	x
	Departure, destination and alternate aerodromes	x	x	x	x
	Airway routings and airspace structure	x	x	x	x
	Meteorological briefing				

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Extraction and analysis of relevant data from meteorological documents	x	x	x	x
	ICAO flight plan (ATS flight plan)				
	Individual flight plan				
	Format of flight plan	x	x	x	x
	Completion of the flight plan	x	x	x	x
	Submission of the flight plan	x	x	x	x
	Flight monitoring and in-flight re- planning				
	Flight monitoring				
	Monitoring of track and time	x	x	x	x
	In-flight fuel management	x	x	x	x
	In-flight re-planning in case of deviation from planned data	x	x	x	x
7.4.	**PERFORMANCE: HELICOPTERS**				
	General				
	Introduction				
	Stages of flight			x	x
	Effect on performance of atmospheric, airport or heliport and helicopter conditions			x	x
	Applicability of airworthiness requirements			x	x
	Definitions and terminology			x	x
	Performance: SE helicopters				
	Definitions of terms (a) masses; (b) velocities: v_x, v_y; (c) velocity of best range and of maximum endurance; (d) power limitations; (e) altitudes.			x	x
	Take-off, cruise and landing performance Use and interpretation of diagrams and tables: (a) Take-off:			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	(1) take-off run and distance available; (2) take-off and initial climb; (3) effects of mass, wind and density altitude; (4) effects of ground surface and gradient. (b) Landing: (1) effects of mass, wind, density altitude and approach speed; (2) effects of ground surface and gradient. (c) In-flight: (1) relationship between power required and power available; (2) performance diagram; (3) effects of configuration, mass, temperature and altitude; (4) reduction of performance during climbing turns; (5) autorotation; (6) adverse effects (icing, rain and condition of the airframe).				
8.	**AIRCRAFT GENERAL KNOWLEDGE**				
8.1.	**AIRFRAME AND SYSTEMS, ELECTRICS, POWERPLANT AND EMERGENCY EQUIPMENT**				
	System design, loads, stresses, maintenance				
	Loads and combination loadings applied to an aircraft's structure	x	x	x	x
	Airframe				
	Wings, tail surfaces and control surfaces				
	Design and constructions	x	x		
	Structural components and materials	x	x		
	Stresses	x	x		
	Structural limitations	x	x		
	Fuselage, doors, floor, wind-screen and windows				
	Design and constructions	x	x	x	x
	Structural components and materials	x	x	x	x
	Stresses	x	x	x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Structural limitations	x	x	x	x
	Flight and control surfaces				
	Design and constructions			x	x
	Structural components and materials			x	x
	Stresses and aero elastic vibrations			x	x
	Structural limitations			x	x
	Hydraulics				
	Hydromechanics: basic principles	x	x	x	x
	Hydraulic systems	x	x	x	x
	Hydraulic fluids: types and characteristics, limitations	x	x	x	x
	System components: design, operation, degraded modes of operation, indications and warnings	x	x	x	x
	Landing gear, wheels, tyres and brakes				
	Landing gear				
	Types and materials	x	x	x	x
	Nose wheel steering: design and operation	x	x		
	Brakes				
	Types and materials	x	x	x	x
	System components: design, operation, indications and warnings	x	x	x	x
	Wheels and tyres				
	Types and operational limitations	x	x	x	x
	Helicopter equipment			x	x
	Flight controls				
	Mechanical or powered	x	x	x	x
	Control systems and mechanical	x	x	x	x
	System components: design, operation, indications and warnings, degraded modes of operation and jamming	x	x	x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Secondary flight controls				
	System components: design, operation, degraded modes of operation, indications and warnings	x	x		
	Anti-icing systems				
	Types and operation (pitot and windshield)	x	x	x	x
	Fuel system				
	Piston engine				
	System components: design, operation, degraded modes of operation, indications and warnings	x	x	x	x
	Turbine engine				
	System components: design, operation, degraded modes of operation, indications and warnings			x	x
	Electrics				
	Electrics: general and definitions				
	Direct current: voltage, current, resistance, conductivity, Ohm's law, power and work	x	x	x	x
	Alternating current: voltage, current, amplitude, phase, frequency and resistance	x	x	x	x
	Circuits: series and parallel	x	x	x	x
	Magnetic field: effects in an electrical circuit	x	x	x	x
	Batteries				
	Types, characteristics and limitations	x	x	x	x
	Battery chargers, characteristics and limitations	x	x	x	x
	Static electricity: general				
	Basic principles	x	x	x	x
	Static dischargers	x	x	x	x
	Protection against interference	x	x	x	x
	Lightning effects	x	x	x	x
	Generation: production, distribution and use				

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	DC generation: types, design, operation, degraded modes of operation, indications and warnings	x	x	x	x
	AC generation: types, design, operation, degraded modes of operation, indications and warnings	x	x	x	x
	Electric components				
	Basic elements: basic principles of switches, circuit-breakers and relays	x	x	x	x
	Distribution				
	General: (a) bus bar, common earth and priority; (b) AC and DC comparison.	x	x	x	x
	Piston engines				
	General				
	Types of internal combustion engine: basic principles and definitions	x	x	x	x
	Engine: design, operation, components and materials	x	x	x	x
	Fuel				
	Types, grades, characteristics and limitations	x	x	x	x
	Alternate fuel: characteristics and limitations	x	x	x	x
	Carburettor or injection system				
	Carburettor: design, operation, degraded modes of operation, indications and warnings	x	x	x	x
	Injection: design, operation, degraded modes of operation, indications and warnings	x	x	x	x
	Icing	x	x	x	x
	Air cooling systems				
	Design, operation, degraded modes of operation, indications and warnings	x	x	x	x
	Lubrication systems				
	Lubricants: types, characteristics and limitations	x	x	x	x
	Design, operation, degraded modes of operation, indications and warnings	x	x	x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Ignition circuits				
	Design, operation, degraded modes of operation	x	x	x	x
	Mixture				
	Definition, characteristic mixtures, control instruments, associated control levers and indications	x	x	x	x
	Propellers				
	Definitions and general: (a) aerodynamic parameters; (b) types; (c) operating modes.	x	x		
	Constant speed propeller: design, operation and system components	x	x		
	Propeller handling: associated control levers, degraded modes of operation, indications and warnings	x	x		
	Performance and engine handling				
	Performance: influence of engine parameters, influence of atmospheric conditions, limitations and power augmentation systems	x	x	x	x
	Engine handling: power and mixture settings during various flight phases and operational limitations	x	x	x	x
	Turbine engines				
	Definitions			x	x
	Coupled turbine engine: design, operation, components and materials			x	x
	Free turbine engine: design, operation, components and materials			x	x
	Fuel				
	Types, characteristics and limitations			x	x
	Main engine components				
	Compressor: (a) types, design, operation, components and materials; (b) stresses and limitations; (c) stall, surge and means of prevention.			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Combustion chamber: (a) types, design, operation, components and materials; (b) stresses and limitations; (c) emission problems.			x	x
	Turbine: (a) types, design, operation, components and materials; (b) stresses, creep and limitations.			x	x
	Exhaust: (a) design, operation and materials; (b) noise reduction.			x	x
	Fuel control units: types, operation and sensors			x	x
	Helicopter air intake: different types, design, operation, materials and optional equipment			x	x
	Additional components and systems				
	Helicopter additional components and systems: lubrication system, ignition circuit, starter, accessory gearbox, free wheel units: design, operation and components			x	x
	Performance aspects				
	Torque, performance aspects, engine handling and limitations: (a) engine ratings; (b) engine performance and limitations; (c) engine handling.			x	x
	Protection and detection systems				
	Fire detection systems				
	Operation and indications			x	x
	Miscellaneous systems				
	Rotor design			x	x
	Rotor heads				
	Main rotor				
	Types			x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Structural components and materials, stresses and structural limitations			x	x
	Design and construction			x	x
	Adjustment			x	x
	Tail rotor				
	Types			x	x
	Structural components and materials, stresses and structural limitations			x	x
	Design and construction			x	x
	Adjustment			x	x
	Transmission				
	Main gear box				
	Different types, design, operation and limitations			x	x
	Rotor brake				
	Different types, design, operation and limitations			x	x
	Auxiliary systems			x	x
	Drive shaft and associated installation			x	x
	Intermediate and tail gear box				
	Different types, design, operation and limitations			x	x
	Blades				
	Main rotor blade				
	Design and construction			x	x
	Structural components and materials			x	x
	Stresses			x	x
	Structural limitations			x	x
	Adjustment			x	x
	Tip shape			x	x
	Tail rotor blade				

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Design and construction			x	x
	Structural components and materials			x	x
	Stresses			x	x
	Structural limitations			x	x
	Adjustment			x	x
8.2.	**INSTRUMENTATION**				
	Instrument and indication systems				
	Pressure gauge				
	Different types, design, operation, characteristics and accuracy	x	x	x	x
	Temperature sensing				
	Different types, design, operation, characteristics and accuracy	x	x	x	x
	Fuel gauge				
	Different types, design, operation, characteristics and accuracy	x	x	x	x
	Flow meter				
	Different types, design, operation, characteristics and accuracy	x	x	x	x
	Position transmitter				
	Different types, design, operation, characteristics and accuracy	x	x	x	x
	Torque meter				
	Design, operation, characteristics and accuracy			x	x
	Tachometer				
	Design, operation, characteristics and accuracy	x	x	x	x
	Measurement of aerodynamic parameters				
	Pressure measurement				
	Static pressure, dynamic pressure, density and definitions	x	x	x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Design, operation, errors and accuracy	x	x	x	x
	Temperature measurement: aeroplane				
	Design, operation, errors and accuracy	x	x		
	Displays	x	x		
	Temperature measurement: helicopter				
	Design, operation, errors and accuracy			x	x
	Displays			x	x
	Altimeter				
	Standard atmosphere	x	x	x	x
	The different barometric references (QNH, QFE and 1013.25)	x	x	x	x
	Height, indicated altitude, true altitude, pressure altitude and density altitude	x	x	x	x
	Design, operation, errors and accuracy	x	x	x	x
	Displays	x	x	x	x
	Vertical speed indicator				
	Design, operation, errors and accuracy	x	x	x	x
	Displays	x	x	x	x
	Air speed indicator				
	The different speeds IAS, CAS, TAS: definition, usage and relationships	x	x	x	x
	Design, operation, errors and accuracy	x	x	x	x
	Displays	x	x	x	x
	Magnetism: direct reading compass				
	Earth magnetic field	x	x	x	x
	Direct reading compass				
	Design, operation, data processing, accuracy and deviation	x	x	x	x
	Turning and acceleration errors	x	x	x	x

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Gyroscopic instruments				
	Gyroscope: basic principles				
	Definitions and design	x	x	x	x
	Fundamental properties	x	x	x	x
	Drifts	x	x	x	x
	Turn and bank indicator				
	Design, operation and errors	x	x	x	x
	Attitude indicator				
	Design, operation, errors and accuracy	x	x	x	x
	Directional gyroscope				
	Design, operation, errors and accuracy	x	x	x	x
	Communication systems				
	Transmission modes: VHF, HF and SATCOM				
	Principles, bandwidth, operational limitations and use	x	x	x	x
	Voice communication				
	Definitions, general and applications	x	x	x	x
	Alerting systems and proximity systems				
	Flight warning systems				
	Design, operation, indications and alarms	x	x	x	x
	Stall warning				
	Design, operation, indications and alarms	x	x		
	Radio-altimeter				
	Design, operation, errors, accuracy and indications			x	x
	Rotor or engine over speed alert system				
	Design, operation, displays and alarms			x	x
	Integrated instruments: electronic displays				
	Display units				

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Design, different technologies and limitations	x	x	x	x
9.	**NAVIGATION**				
9.1.	**GENERAL NAVIGATION**				
	Basics of navigation				
	The solar system				
	Seasonal and apparent movements of the sun	x		x	
	The earth				
	Great circle, small circle and rhumb line	x		x	
	Latitude and difference of latitude	x		x	
	Longitude and difference of longitude	x		x	
	Use of latitude and longitude co-ordinates to locate any specific position	x		x	
	Time and time conversions				
	Apparent time	x		x	
	UTC	x		x	
	LMT	x		x	
	Standard times	x		x	
	Dateline	x		x	
	Definition of sunrise, sunset and civil twilight	x		x	
	Directions				
	True north, magnetic north and compass north	x		x	
	Compass deviation	x		x	
	Magnetic poles, isogonals, relationship between true and magnetic	x		x	
	Distance				
	Units of distance and height used in navigation: nautical miles, statute miles, kilometres, metres and ft	x		x	
	Conversion from one unit to another	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Relationship between nautical miles and minutes of latitude and minutes of longitude	x		x	
	Magnetism and compasses				
	General principles				
	Terrestrial magnetism	x		x	
	Resolution of the earth's total magnetic force into vertical and horizontal components	x		x	
	Variation-annual change	x		x	
	Aircraft magnetism				
	The resulting magnetic fields	x		x	
	Keeping magnetic materials clear of the compass	x		x	
	Charts				
	General properties of miscellaneous types of projections				
	Direct Mercator	x		x	
	Lambert conformal conic	x		x	
	The representation of meridians, parallels, great circles and rhumb lines				
	Direct Mercator	x		x	
	Lambert conformal conic	x		x	
	The use of current aeronautical charts				
	Plotting positions	x		x	
	Methods of indicating scale and relief (ICAO topographical chart)	x		x	
	Conventional signs	x		x	
	Measuring tracks and distances	x		x	
	Plotting bearings and distances	x		x	
	DR navigation				
	Basis of DR				

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Track	x		x	
	Heading (compass, magnetic and true)	x		x	
	Wind velocity	x		x	
	Air speed (IAS, CAS and TAS)	x		x	
	Groundspeed	x		x	
	ETA	x		x	
	Drift and wind correction angle	x		x	
	DR position fix	x		x	
	Use of the navigational computer				
	Speed	x		x	
	Time	x		x	
	Distance	x		x	
	Fuel consumption	x		x	
	Conversions	x		x	
	Air speed	x		x	
	Wind velocity	x		x	
	True altitude	x		x	
	The triangle of velocities				
	Heading	x		x	
	Ground speed	x		x	
	Wind velocity	x		x	
	Track and drift angle	x		x	
	Measurement of DR elements				
	Calculation of altitude	x		x	
	Determination of appropriate speed	x		x	
	In-flight navigation				

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Use of visual observations and application to in-flight navigation	x		x	
	Navigation in cruising flight, use of fixes to revise navigation data				
	Ground speed revision	x		x	
	Off-track corrections	x		x	
	Calculation of wind speed and direction	x		x	
	ETA revisions	x		x	
	Flight log	x		x	
9.2.	**RADIO NAVIGATION**				
	Basic radio propagation theory				
	Antennas				
	Characteristics	x		x	
	Wave propagation				
	Propagation with the frequency bands	x		x	
	Radio aids				
	Ground DF				
	Principles	x		x	
	Presentation and interpretation	x		x	
	Coverage	x		x	
	Range	x		x	
	Errors and accuracy	x		x	
	Factors affecting range and accuracy	x		x	
	NDB/ADF				
	Principles	x		x	
	Presentation and interpretation	x		x	
	Coverage	x		x	
	Range	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Errors and accuracy	x		x	
	Factors affecting range and accuracy	x		x	
	VOR				
	Principles	x		x	
	Presentation and interpretation	x		x	
	Coverage	x		x	
	Range	x		x	
	Errors and accuracy	x		x	
	Factors affecting range and accuracy	x		x	
	DME				
	Principles	x		x	
	Presentation and interpretation	x		x	
	Coverage	x		x	
	Range	x		x	
	Errors and accuracy	x		x	
	Factors affecting range and accuracy	x		x	
	Radar				
	Ground radar				
	Principles	x		x	
	Presentation and interpretation	x		x	
	Coverage	x		x	
	Range	x		x	
	Errors and accuracy	x		x	
	Factors affecting range and accuracy	x		x	
	Secondary surveillance radar and transponder				
	Principles	x		x	
	Presentation and interpretation	x		x	

		Aeroplane		Helicopter	
		PPL	Bridge course	PPL	Bridge course
	Modes and codes	x		x	
	GNSS				
	GPS, GLONASS OR GALILEO				
	Principles	x		x	
	Operation	x		x	
	Errors and accuracy	x		x	
	Factors affecting accuracy	x		x	

AMC2 FCL.210; FCL.215

Syllabus of theoretical knowledge for the PPL(AS)

The following table contains the syllabi for the courses of theoretical knowledge, as well as for the theoretical knowledge examinations for the PPL(As). The training and examination should cover aspects related to non-technical skills in an integrated manner, taking into account the particular risks associated to the licence and the activity.

		PPL
1.	**AIR LAW AND ATC PROCEDURES**	
	International law: conventions, agreements and organisations	x
	Airworthiness of aircraft	x
	Aircraft nationality and registration marks	x
	Personnel licensing	x
	Rules of the air	x
	Procedures for air navigation services: aircraft operations	x
	Air traffic services and air traffic management	x
	Aeronautical information service	x
	Aerodromes	x
	Search and rescue	x
	Security	x
	Aircraft accident and incident investigation	x
	National law	x

2.	**HUMAN PERFORMANCE**	
	Human factors: basic concepts	x
	Basic aviation physiology and health maintenance	x
	Basic aviation psychology	x
3.	**METEOROLOGY**	
	The atmosphere	x
	Wind	x
	Thermodynamics	x
	Clouds and fog	x
	Precipitation	x
	Air masses and fronts	x
	Pressure systems	x
	Climatology	x
	Flight hazards	x
	Meteorological information	x
4.	**COMMUNICATIONS**	
	VFR COMMUNICATIONS	
	Definitions	x
	General operating procedures	x
	Relevant weather information terms (VFR)	x
	Action required to be taken in case of communication failure	x
	Distress and urgency procedures	x
	General principles of VHF propagation and allocation of frequencies	x
5.	**PRINCIPLES OF FLIGHT**	
	Basics of aerostatics	x
	Basics of subsonic aerodynamics	x
	Aerodynamics of airships	x
	Stability	x
	Controllability	x
	Limitations	x
	Propellers	x
	Basics of airship flight mechanics	x

6.	**OPERATIONAL PROCEDURES**	
	General requirements	x
	Special operational procedures and hazards (general aspects)	x
	Emergency procedures	x
7.	**FLIGHT PERFORMANCE AND PLANNING**	
7.1	**MASS AND BALANCE**	
	Purpose of mass and balance considerations	x
	Loading	x
	Fundamentals of CG calculations	x
	Mass and balance details of aircraft	x
	Determination of CG position	x
	Passenger, cargo and ballast handling	x
7.2	**PERFORMANCE**	
	Airworthiness requirements	x
	Basics of airship performance	x
	Definitions and terms	x
	Stages of flight	x
	Use of flight manual	x
7.3	**FLIGHT PLANNING AND FLIGHT MONITORING**	
	Flight planning for VFR flights	x
	Fuel planning	x
	Pre-flight preparation	x
	ATS flight plan	x
	Flight monitoring and in-flight re-planning	x
8.	**AIRCRAFT GENERAL KNOWLEDGE**	
8.1	**ENVELOPE, AIRFRAME AND SYSTEMS, ELECTRICS, POWERPLANT AND EMERGENCY EQUIPMENT**	
	Design, materials, loads and stresses	x
	Envelope and airbags	x
	Framework	x
	Gondola	x
	Flight controls	x

	Landing gear	x
	Hydraulics and pneumatics	x
	Heating and air conditioning	x
	Fuel system	x
	Piston engines (propellers)	x
	Turbine engines (basics)	x
	Electrics	x
	Fire protection and detection systems	x
	Maintenance	x
8.2	**INSTRUMENTATION**	
	Sensors and instruments	x
	Measurement of air data and gas parameters	x
	Magnetism: direct reading compass and flux valve	x
	Gyroscopic instruments	x
	Communication systems	x
	Alerting systems	x
	Integrated instruments: electronic displays	x
	Flight management system (general basics)	x
	Digital circuits and computers	x
9.	**NAVIGATION**	
9.1.	**GENERAL NAVIGATION**	
	Basics of navigation	x
	Magnetism and compasses	x
	Charts	x
	DR navigation	x
	In-flight navigation	x
9.2.	**RADIO NAVIGATION**	
	Basic radio propagation theory	x
	Radio aids	x
	Radar	x
	GNSS	x

AMC3 FCL.210; FCL.215

Syllabus of theoretical knowledge for the BPL and SPL

The syllabi for the theoretical knowledge instruction and examination for the LAPL(B) and LAPL(S) in AMC1 FCL.115 and FCL.120 should be used for the BPL and SPL, respectively.

AMC1 FCL.215; FCL.235

Theoretical knowledge examination and skill test for the PPL

Theoretical knowledge examination

(1) The examinations should comprise a total of 120 multiple-choice questions covering all the subjects.

(2) Communication practical classroom testing may be conducted.

(3) The period of 18 months mentioned in FCL.025 (b)(2) should be counted from the end of the calendar month when the applicant first attempted an examination.

Skill test

Further training may be required following any failed skill test or part thereof. There should be no limit to the number of skill tests that may be attempted.

Conduct of the test

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

(2) Any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skill requires a complete retest.

(3) An applicant should be required to fly the aircraft from a position where the PIC functions can be performed and to carry out the test as if there is no other crew member. Responsibility for the flight should be allocated in accordance with national regulations.

AMC1 FCL.235 Skill test

Contents of the skill test for the issue of a PPL(A)

(a) The route to be flown for the navigation test should be chosen by the FE. The route may end at the aerodrome of departure or at another aerodrome. The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board. The navigation section of the test should have a duration that allows the pilot to demonstrate his/her ability to complete a route with at least three identified waypoints and may, as agreed between the applicant and FE, be flown as a separate test.

(b) An applicant should indicate to the FE the checks and duties carried out, including the identification of radio facilities. Checks should be completed in accordance with the authorised checklist for the aeroplane on which the test is being taken. During pre- flight preparation for the test the applicant should be required to determine power settings and speeds. Performance data for take-

off, approach and landing should be calculated by the applicant in compliance with the operations manual or flight manual for the aeroplane used.

Flight test tolerance

(c) The applicant should demonstrate the ability to:

(1) operate the aeroplane within its limitations;

(2) complete all manoeuvres with smoothness and accuracy;

(3) exercise good judgment and airmanship;

(4) apply aeronautical knowledge;

(5) maintain control of the aeroplane at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

The following limits are for general guidance. The FE should make allowance for turbulent conditions and the handling qualities and performance of the aeroplane used:

(1) height:

(i)	normal flight	± 150 ft
(ii)	with simulated engine failure	± 200 ft (if ME aeroplane is used)

(2) heading or tracking of radio aids:

(i)	normal flight	± 10 °
(ii)	with simulated engine failure	± 15 ° (if ME aeroplane is used)

(3) speed:

(i)	take-off and approach	+15/–5 knots
(ii)	all other flight regimes	± 15 knots

Content of the skill test

(d) The skill test contents and sections set out in this AMC should be used for the skill test for the issue of a PPL(A) on SE and ME aeroplanes or on TMGs.

SECTION 1 PRE-FLIGHT OPERATIONS AND DEPARTURE	
Use of checklist, airmanship, control of aeroplane by external visual reference, anti/de-icing procedures, etc. apply in all sections.	
a	Pre-flight documentation, NOTAM and weather briefing
b	Mass and balance and performance calculation
c	Aeroplane inspection and servicing
d	Engine starting and after starting procedures
e	Taxiing and aerodrome procedures, pre-take-off procedures
f	Take-off and after take-off checks
g	Aerodrome departure procedures
h	ATC compliance and R/T procedures
SECTION 2 GENERAL AIRWORK	

a	ATC compliance and R/T procedures
b	Straight and level flight, with speed changes
c	Climbing: i. best rate of climb; ii. climbing turns; iii. levelling off.
d	Medium (30 ° bank) turns
e	Steep (45 ° bank) turns (including recognition and recovery from a spiral dive)
f	Flight at critically low air speed with and without flaps
g	Stalling: i. clean stall and recover with power; ii. approach to stall descending turn with bank angle 20°, approach configuration; iii. approach to stall in landing configuration.
h	Descending: i. with and without power; ii. descending turns (steep gliding turns); iii. levelling off.
SECTION 3 EN-ROUTE PROCEDURES	
a	Flight plan, dead reckoning and map reading
b	Maintenance of altitude, heading and speed
c	Orientation, timing and revision of ETAs and log keeping
d	Diversion to alternate aerodrome (planning and implementation)
e	Use of radio navigation aids
f	Basic instrument flying check (180 ° turn in simulated IMC)
g	Flight management (checks, fuel systems and carburettor icing, etc.)
h	ATC compliance and R/T procedures
SECTION 4 APPROACH AND LANDING PROCEDURES	
a	Aerodrome arrival procedures
b	* Precision landing (short field landing), crosswind, if suitable conditions available
c	* Flapless landing
d	* Approach to landing with idle power (SE only)
e	Touch and go

f	Go-around from low height
g	ATC compliance and R/T procedures
h	Actions after flight
SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES	
This section may be combined with sections 1 through 4	
a	Simulated engine failure after take-off (SE only)
b	* Simulated forced landing (SE only)
c	Simulated precautionary landing (SE only)
d	Simulated emergencies
e	Oral questions
SECTION 6 SIMULATED ASYMMETRIC FLIGHT AND RELEVANT CLASS OR TYPE ITEMS	
This section may be combined with sections 1 through 5	
a	Simulated engine failure during take-off (at a safe altitude unless carried out in an FFS)
b	Asymmetric approach and go-around
c	Asymmetric approach and full stop landing
d	Engine shutdown and restart
e	ATC compliance, R/T procedures or airmanship
f	As determined by the FE: any relevant items of the class or type rating skill test to include, if applicable: i. aeroplane systems including handling of auto pilot; ii. operation of pressurisation system; iii. use of de-icing and anti-icing system.
g	Oral questions

* These items may be combined, at the discretion of the FE.

AMC1 FCL.215; FCL.235

THEORETICAL KNOWLEDGE EXAMINATION AND SKILL TEST FOR THE PPL

(a) Theoretical knowledge examination

(1) The examinations should comprise a total of 120 multiple-choice questions covering all the subjects.

(2) Communication practical classroom testing may be conducted.

(3) The period of 18 months mentioned in FCL.025(b)(2) should be counted from the end of the calendar month when the applicant first attempted an examination.

(b) Skill test

Further training may be required following any failed skill test or part thereof. There should be no limit to the number of skill tests that may be attempted.

(c) Conduct of the test

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

(2) Any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skill requires a complete retest.

AMC2 FCL.235 Skill test

Contents of the skill test for the issue of a PPL(H)

(a) The area and route to be flown should be chosen by the FE and all low level and hover work should be at an adequate aerodrome or site. Routes used for section 3 may end at the aerodrome of departure or at another aerodrome. The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board. The navigation section of the test, as set out in this AMC should consist of at least three legs, each leg of a minimum duration of 10 minutes. The skill test may be conducted in two flights.

(b) An applicant should indicate to the FE the checks and duties carried out, including the identification of radio facilities. Checks should be completed in accordance with the authorised checklist or pilot operating handbook for the helicopter on which the test is being taken. During pre-flight preparation for the test the applicant is required to determine power settings and speeds. Performance data for take-off, approach and landing should be calculated by the applicant in compliance with the operations manual or flight manual for the helicopter used.

Flight test tolerance

(c) The applicant should demonstrate the ability to:

(1) operate the helicopter within its limitations;

(2) complete all manoeuvres with smoothness and accuracy;

(3) exercise good judgement and airmanship;

(4) apply aeronautical knowledge;

(5) maintain control of the helicopter at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

(d) The following limits are for general guidance. The FE should make allowance for turbulent conditions and the handling qualities and performance of the helicopter used.

(1) height:

(i)	normal forward flight	± 150 ft
(ii)	with simulated major emergency	± 200 ft
(iii)	hovering IGE flight	± 2 ft

(2) heading or tracking of radio aids:

(i)	normal flight	± 10°
(ii)	with simulated major emergency speed:	± 15°

(3) Speed

(i)	take-off approach	– 10 knots/+15 knots
(ii)	all other flight regimes	± 15 knots

(4) ground drift:

(i)	take-off hover IGE	± 3 ft
(ii)	landing	no sideways or backwards movement

Content of the skill test

The skill test contents and sections set out in this AMC should be used for the skill test for the issue of a PPL(H) on SE or ME helicopters.

SECTION 1 PRE-FLIGHT OR POST-FLIGHT CHECKS AND PROCEDURES	
Use of checklist, airmanship, control of helicopter by external visual reference, anti- icing procedures, etc. apply in all sections	
a	Helicopter knowledge, (for example technical log, fuel, mass and balance, performance), flight planning, NOTAM and weather briefing
b	Pre-flight inspection or action, location of parts and purpose
c	Cockpit inspection and starting procedure
d	Communication and navigation equipment checks, selecting and setting frequencies
e	Pre-take-off procedure, R/T procedure and ATC compliance
f	Parking, shutdown and post-flight procedure
SECTION 2 HOVER MANOEUVRES, ADVANCED HANDLING AND CONFINED AREAS	
a	Take-off and landing (lift-off and touch down)
b	Taxi and hover taxi
c	Stationary hover with head, cross or tail wind
d	Stationary hover turns, 360 ° left and right (spot turns)
e	Forward, sideways and backwards hover manoeuvring

f	Simulated engine failure from the hover
g	Quick stops into and downwind
h	Sloping ground or unprepared sites landings and take-offs
i	Take-offs (various profiles)
j	Crosswind and downwind take-off (if practicable)
k	Take-off at maximum take-off mass (actual or simulated)
l	Approaches (various profiles)
m	Limited power take-off and landing
n	Autorotations, (FE to select two items from: basic, range, low speed and 360 ° turns)
o	Autorotative landing
p	Practice forced landing with power recovery
q	Power checks, reconnaissance technique, approach and departure technique
SECTION 3 NAVIGATION - EN ROUTE PROCEDURES	
a	Navigation and orientation at various altitudes or heights and map reading
b	Altitude or height, speed, heading control, observation of airspace and altimeter setting
c	Monitoring of flight progress, flight log, fuel usage, endurance, ETA, assessment of track error and re-establishment of correct track and instrument monitoring
d	Observation of weather conditions and diversion planning
e	Use of navigation aids (where available)
f	ATC liaison with due observance of regulations, etc.
SECTION 4 FLIGHT PROCEDURES AND MANOEUVRES	
a	Level flight, control of heading, altitude or height and speed
b	Climbing and descending turns to specified headings
c	Level turns with up to 30 ° bank, 180 ° to 360 ° left and right
d	Level turns 180 ° left and right by sole reference to instruments
SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES (SIMULATED WHERE APPROPRIATE)	
Note (1) Where the test is conducted on an ME helicopter, a simulated engine failure drill, including an SE approach and landing should be included in the test.	
Note (2) The FE should select four items from the following:	
a	Engine malfunctions, including governor failure, carburettor or engine icing and oil system, as appropriate
b	Fuel system malfunction
c	Electrical system malfunction

d	Hydraulic system malfunction, including approach and landing without hydraulics, as applicable
e	Main rotor or anti-torque system malfunction (FFS or discussion only)
f	Fire drills, including smoke control and removal, as applicable
g	Other abnormal and emergency procedures as outlined in an appropriate flight manual and with reference to Appendix 9 C to Part-FCL, sections 3 and 4, including for ME helicopters: (a) Simulated engine failure at take-off: (1) rejected take-off at or before TDP or safe forced landing at or before DPATO; (2) shortly after TDP or DPATO. (b) Landing with simulated engine failure: (1) landing or go-around following engine failure before LDP or DPBL; (2) following engine failure after LDP or safe forced landing after DPBL.

AMC3 FCL.235 Skill test

Content of the skill test for the issue of the PPL(AS)

The area and route to be flown is chosen by the FE. Routes used for section 3 may end at the aerodrome of departure or at another aerodrome and one destination should be a controlled aerodrome. The skill test may be conducted in two flights. The total duration of the flight(s) should be at least 60 minutes.

The applicant should demonstrate the ability to:

(1) operate the airship within its limitations;

(2) complete all manoeuvres with smoothness and accuracy;

(3) exercise good judgement and airmanship;

(4) apply aeronautical knowledge;

(5) maintain control of the airship at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

Flight test tolerances

The following limits should apply, corrected to make allowance for turbulent conditions and the handling qualities and performance of the airship used.

(1) height:

(i) normal flight ±200 ft

(ii) simulated major emergency ±300 ft

(2) tracking on radio aids: ±15 °

(3) heading:

(i) normal flight ±15 °

(ii) simulated major emergency ±20 °

Content of the test

The skill test contents and sections set out in this AMC should be used for the skill test for the issue of a PPL(As).

Items in sections 5 and 6 may be performed in an FNPT (As) or a FS (As).

SECTION 1 PRE-FLIGHT OPERATIONS AND DEPARTURE	
Use of airship checklists, airmanship, control of airship by external visual reference, anti-icing procedures, and principles of threat and error management, etc. apply in all sections	
a	Pre-flight, including: flight planning, documentation, mass and balance, NOTAM and weather briefing
b	Airship inspection and servicing
c	Off-mast procedure, ground manoeuvring and take-off
d	Performance considerations and trim
e	Aerodrome and traffic pattern operations
f	Departure procedure, altimeter setting, collision avoidance (look-out)
g	ATC compliance and R/T procedures
SECTION 2 GENERAL AIRWORK	
a	Control of the airship by external visual reference, including straight and level, climb, descent and look-out
b	Flight close to pressure height
c	Turns
d	Steep descents and climbs
e	Flight by reference solely to instruments, including: i. Level flight, control of heading, altitude and air speed; ii. Climbing and descending turns; iii. Recoveries from unusual attitudes.
f	ATC compliance and R/T procedures
SECTION 3 EN-ROUTE PROCEDURES	
a	Flight plan, dead reckoning and map reading
b	Maintenance of altitude, heading and speed and collision avoidance (look-out procedures)
c	Orientation, timing and revision of ETAs and log keeping
d	Observation of weather conditions and diversion to alternate aerodrome (planning and implementation)
e	Use of radio navigation aids
f	Flight management (checks, fuel systems, etc.)
g	ATC compliance and R/T procedures
SECTION 4 APPROACH AND LANDING PROCEDURES	
a	Aerodrome arrival procedures, altimeter setting, checks and look-out
b	ATC compliance and R/T procedures
c	Go-around action
d	Normal landing

e	Short field landing
f	Post-flight actions
SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES	
This section may be combined with sections 1 through 4	
a	Simulated engine failure after take-off (at a safe altitude) and fire drill
b	Equipment malfunctions
c	Forced landing (simulated)
d	ATC compliance and R/T procedures
e	Oral questions
SECTION 6 RELEVANT TYPE ITEMS	
This section may be combined with sections 1 through 5	
a	Simulated engine failure during take-off (at a safe altitude unless carried out in a FFS)
b	Approach and go-around with failed engine(s)
c	Approach and full stop landing with failed engine(s)
d	Malfunctions in the envelope pressure system
e	ATC compliance, R/T procedures and airmanship
f	As determined by the FE: any relevant items of the type rating skill test to include, if applicable: i. Airship systems; ii. Operation of envelope pressure system.
g	Oral questions

AMC1 FCL.210.A PPL(A) Experience requirements and crediting

Flight instruction for the PPL(A)

Entry to training

Before being accepted for training an applicant should be informed that the appropriate medical certificate must be obtained before solo flying is permitted.

Flight instruction

(1) The PPL(A) flight instruction syllabus takes into account the principles of threat and error management and also covers:

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

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

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

(iv) flight at critically low air speeds, recognition of, and recovery from, incipient and full stalls;

(v) flight at critically high air speeds, recognition of, and recovery from, spiral dive;

(vi) normal and crosswind take-offs and landings;

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

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

(ix) cross-country flying using visual reference, dead reckoning and radio navigation aids;

(x) emergency operations, including simulated aeroplane equipment malfunctions;

(xi) operations to, from and transiting controlled aerodromes, compliance with air traffic services procedures, communication procedures and phraseology.

(2) Before allowing the applicant for a PPL(A) to undertake his/her first solo flight, the FI should ensure that the applicant can use R/T communication.

Syllabus of flight instruction

(1) 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:

(i) the applicant's progress and ability;

(ii) the weather conditions affecting the flight;

(iii) the flight time available;

(iv) instructional technique considerations;

(v) the local operating environment;

(vi) applicability of the exercises to the aeroplane.

(2) Each of the exercises involves the need for the applicant to be aware of the needs of good airmanship and look-out, which should be emphasised at all times.

(i) Exercise 1a: Familiarisation with the aeroplane:

(A) characteristics of the aeroplane;

(B) cockpit layout;

(C) systems;

(D) checklists, drills and controls.

(ii) Exercise 1b: Emergency drills:

(A) action if fire on the ground and in the air;

(B) engine cabin and electrical system fire;

(C) systems failure;

(D) escape drills, location and use of emergency equipment and exits.

(iii) Exercise 2: Preparation for and action after flight:

(A) flight authorisation and aeroplane acceptance;

(B) serviceability documents;

(C) equipment required, maps, etc.;
(D) external checks;
(E) internal checks;
(F) harness, seat or rudder panel adjustments;
(G) starting and warm-up checks;
(H) power checks;
(I) running down system checks and switching off the engine;
(J) parking, security and picketing (for example tie down);
(K) completion of authorisation sheet and serviceability documents.

(iv) Exercise 3: Air experience: flight exercise.

(v) Exercise 4: Effects of controls:
(A) primary effects when laterally level and when banked;
(B) further effects of aileron and rudder;
(C) effects of:
(a) air speed;
(b) slipstream;
(c) power;
(d) trimming controls;
(e) flaps;
(f) other controls, as applicable.
(D) operation of:
(a) mixture control;
(b) carburettor heat;
(c) cabin heating or ventilation.

(vi) Exercise 5a: Taxiing:
(A) pre-taxi checks;
(B) starting, control of speed and stopping;
(C) engine handling;
(D) control of direction and turning;
(E) turning in confined spaces;
(F) parking area procedure and precautions;
(G) effects of wind and use of flying controls;
(H) effects of ground surface;
(I) freedom of rudder movement;
(J) marshalling signals;
(K) instrument checks;
(L) air traffic control procedures.

(vii) Exercise 5b: Emergencies: brake and steering failure.

(viii) Exercise 6: Straight and level:

(A) at normal cruising power, attaining and maintaining straight and level flight;

(B) flight at critically high air speeds;

(C) demonstration of inherent stability;

(D) control in pitch, including use of trim;

(E) lateral level, direction and balance and trim;

(F) at selected air speeds (use of power);

(G) during speed and configuration changes;

(H) use of instruments for precision.

(ix) Exercise 7: Climbing:

(A) entry, maintaining the normal and max rate climb and levelling off;

(B) levelling off at selected altitudes;

(C) en-route climb (cruise climb);

(D) climbing with flap down;

(E) recovery to normal climb;

(F) maximum angle of climb;

(G) use of instruments for precision.

(x) Exercise 8: Descending:

(A) entry, maintaining and levelling off;

(B) levelling off at selected altitudes;

(C) glide, powered and cruise descent (including effect of power and air speed);

(D) side slipping (on suitable types);

(E) use of instruments for precision flight.

(xi) Exercise 9: Turning:

(A) entry and maintaining medium level turns;

(B) resuming straight flight;

(C) faults in the turn (for example in correct pitch, bank and balance);

(D) climbing turns;

(E) descending turns;

(F) faults in the turns (slipping and skidding on suitable types);

(G) turns onto selected headings, use of gyro heading indicator and compass;

(H) use of instruments for precision.

(xii) Exercise 10a: 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 aeroplane in balance while returning to normal air speed.

(A) safety checks;

(B) introduction to slow flight;

(C) controlled flight down to critically slow air speed;

(D) application of full power with correct attitude and balance to achieve normal climb speed.

(xiii) Exercise 10b: Stalling:

(A) safety checks;

(B) symptoms;

(C) recognition;

(D) clean stall and recovery without power and with power;

(E) recovery when a wing drops;

(F) approach to stall in the approach and in the landing configurations, with and without power and recovery at the incipient stage.

(xiv) Exercise 11: Spin avoidance:

(A) safety checks;

(B) stalling and recovery at the incipient spin stage (stall with excessive wing drop, about 45 °);

(C) instructor induced distractions during the stall.

Note 1: at least two hours of stall awareness and spin avoidance flight training should be completed during the course.

Note 2: consideration of manoeuvre limitations and the need to refer to the aeroplane manual and mass and balance calculations.

(xv) Exercise 12: Take-off and climb to downwind position:

(A) pre-take-off checks;

(B) into wind take-off;

(C) safeguarding the nose wheel;

(D) crosswind take-off;

(E) drills during and after take-off;

(F) short take-off and soft field procedure/techniques including performance calculations;

(G) noise abatement procedures.

(xvi) Exercise 13: Circuit, approach and landing:

(A) circuit procedures, downwind and base leg;

(B) powered approach and landing;

(C) safeguarding the nose wheel;

(D) effect of wind on approach and touchdown speeds and use of flaps;

(E) crosswind approach and landing;

(F) glide approach and landing;

(G) short landing and soft field procedures or techniques;

(H) flapless approach and landing;

(I) wheel landing (tail wheel aeroplanes);

(J) missed approach and go-around;

(K) noise abatement procedures.

(xvii) Exercise 12/13: Emergencies:

(A) abandoned take-off;

(B) engine failure after take-off;

(C) mislanding and go-around;

(D) missed approach.

Note: in the interests of safety it will be necessary for pilots trained on nose wheel aeroplanes to undergo dual conversion training before flying tail wheel aeroplanes, and vice-versa.

(xviii) Exercise 14: First solo:

(A) instructor's briefing, observation of flight and de-briefing;

Note: during flights immediately following the solo circuit consolidation the following should be revised:

(B) procedures for leaving and rejoining the circuit;

(C) the local area, restrictions, map reading;

(D) use of radio aids for homing;

(E) turns using magnetic compass, compass errors.

(xix) Exercise 15: Advanced turning:

(A) steep turns (45 °), level and descending;

(B) stalling in the turn and recovery;

(C) recoveries from unusual attitudes, including spiral dives.

(xx) Exercise 16: Forced landing without power:

(A) forced landing procedure;

(B) choice of landing area, provision for change of plan;

(C) gliding distance;

(D) descent plan;

(E) key positions;

(F) engine cooling;

(G) engine failure checks;

(H) use of radio;

(I) base leg;

(J) final approach;

(K) landing;

(L) actions after landing.

(xxi) Exercise 17: Precautionary landing:

(A) full procedure away from aerodrome to break-off height;

(B) occasions necessitating;

(C) in-flight conditions;

(D) landing area selection:

(a) normal aerodrome;

(b) disused aerodrome;

(c) ordinary field.

(E) circuit and approach;

(F) actions after landing.

(xxii) Exercise 18a: Navigation:

(A) flight planning:

(a) weather forecast and actuals;

(b) map selection and preparation:

(1) choice of route;

(2) controlled airspace;

(3) danger, prohibited and restricted areas;

(4) safety altitudes.

(c) calculations:

(1) magnetic heading(s) and time(s) en-route;

(2) fuel consumption;

(3) mass and balance;

(4) mass and performance.

(d) flight information:

(1) NOTAMs etc.;

(2) radio frequencies;

(3) selection of alternate aerodromes.

(e) aeroplane documentation;

(f) notification of the flight:

(1) pre-flight administrative procedures;

(2) flight plan form.

(B) departure:

(a) organisation of cockpit workload;

(b) departure procedures:
  (1) altimeter settings;
  (2) ATC liaison in controlled or regulated airspace;
  (3) setting heading procedure;
  (4) noting of ETAs.
(c) maintenance of altitude and heading;
(d) revisions of ETA and heading;
(e) log keeping;
(f) use of radio;
(g) use of navaids;
(h) minimum weather conditions for continuation of flight;
(i) in-flight decisions;
(j) transiting controlled or regulated airspace;
(k) diversion procedures;
(l) uncertainty of position procedure;
(m) lost procedure.

(C) arrival and aerodrome joining procedure:
(a) ATC liaison in controlled or regulated airspace;
(b) altimeter setting;
(c) entering the traffic pattern;
(d) circuit procedures;
(e) parking;
(f) security of aeroplane;
(g) refuelling;
(h) closing of flight plan, if appropriate;
(i) post-flight administrative procedures.

(xxiii) Exercise 18b: Navigation problems at lower levels and in reduced visibility:
(A) actions before descending;
(B) hazards (for example obstacles and terrain);
(C) difficulties of map reading;
(D) effects of wind and turbulence;
(E) vertical situational awareness (avoidance of controlled flight into terrain);
(F) avoidance of noise sensitive areas;
(G) joining the circuit;
(H) bad weather circuit and landing.

(xxiv) Exercise 18c: Radio navigation:

(A) use of GNSS:

(a) selection of waypoints;

(b) to or from indications and orientation;

(c) error messages.

(B) use of VHF omni range:

(a) availability, AIP and frequencies;

(b) selection and identification;

(c) OBS;

(d) to or from indications and orientation;

(e) CDI;

(f) determination of radial;

(g) intercepting and maintaining a radial;

(h) VOR passage;

(i) obtaining a fix from two VORs.

(C) use of ADF equipment: NDBs:

(a) availability, AIP and frequencies;

(b) selection and identification;

(c) orientation relative to the beacon;

(d) homing.

(D) use of VHF/DF:

(a) availability, AIP, frequencies;

(b) R/T procedures and ATC liaison;

(c) obtaining a QDM and homing.

(E) use of en-route or terminal radar:

(a) availability and AIP;

(b) procedures and ATC liaison;

(c) pilot's responsibilities;

(d) secondary surveillance radar:

(1) transponders;

(2) code selection;

(3) interrogation and reply.

(F) use of DME:

(a) station selection and identification;

(b) modes of operation: distance, groundspeed and time to run.

(xxv) Exercise 19: Basic instrument flight:

(A) physiological sensations;

(B) instrument appreciation; attitude instrument flight;

(C) instrument limitations;

(D) basic manoeuvres:

(a) straight and level at various air speeds and configurations;

(b) climbing and descending;

(c) standard rate turns, climbing and descending, onto selected headings;

(d) recoveries from climbing and descending turns.

BITD

(1) A BITD may be used for flight training for:

(i) flight by reference solely to instruments;

(ii) navigation using radio navigation aids;

(iii) basic instrument flight.

(2) The use of the BITD should be subject to the following:

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

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

(iii) A FI(A) or STI(A) should conduct the instruction.

AMC1 FCL.210.H PPL(H) Experience requirements and crediting

Flight instruction for the PPL(H)

Entry to training

Before being accepted for training an applicant should be informed that the appropriate medical certificate must be obtained before solo flying is permitted.

Ground instruction

Enhanced ground instruction in weather interpretation, planning and route assessment, decision making on encountering DVE including reversing course or conducting a precautionary landing.

Flight instruction

(1) The PPL(H) flight instruction syllabus should take into account the principles of threat and error management and cover:

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

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

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

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

(v) emergency procedures, basic autorotations, simulated engine failure, ground resonance recovery if relevant to type;

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

(vii) incipient vortex ring recognition and recovery;

(viii) touchdown autorotations, simulated engine-off landings, practice forced landings. Simulated equipment malfunctions and emergency procedures relating to malfunctions of engines, controls, electrical and hydraulic circuits;

(ix) steep turns;

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

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

(xii) flight by sole reference to basic flight instruments, including completion of a level 180 ° turn and recovery from unusual attitudes to simulate inadvertent entry into cloud (this training may be conducted by an FI(H));

(xiii) cross-country flying by using visual reference, DR, GNNS and, where available, radio navigation aids; simulation of deteriorating weather conditions and actions to divert or conduct precautionary landing;

(xiv) operations to, from and transiting controlled aerodromes; compliance with air traffic services procedures, communication procedures and phraseology.

(2) Before allowing the applicant for a PPL(H) to undertake his/her first solo flight, the FI should ensure that the applicant can use R/T communication.

(3) Wherever possible, flight simulation should be used to demonstrate to student pilots the effects of flight into DVE and to enhance their understanding and need for avoidance of this potentially fatal flight regime.

Syllabus of flight instruction

(1) 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:

(i) the applicant’s progress and ability;

(ii) the weather conditions affecting the flight;

(iii) the flight time available;

(iv) instructional technique considerations;

(v) the local operating environment;

(vi) applicability of the exercises to the helicopter.

(2) Each of the exercises involves the need for the applicant to be aware of the needs of good airmanship and look-out, which should be emphasised at all times.

(i) Exercise 1a: Familiarisation with the helicopter:

(A) characteristics of the helicopter, external features;

(B) cockpit layout;

(C) systems;

(D) checklists, procedures and controls.

(ii) Exercise 1b: Emergency procedures:

(A) action if fire on the ground and in the air;

(B) engine, cabin and electrical system fire;

(C) systems failures;

(D) escape drills, location and use of emergency equipment and exits.

(iii) Exercise 2: Preparation for and action after flight:

(A) flight authorisation and helicopter acceptance;

(B) serviceability documents;

(C) equipment required, maps, etc.;

(D) external checks;

(E) internal checks;

(F) seat, harness and flight controls adjustments;

(G) starting and warm-up checks clutch engagement and starting rotors;

(H) power checks;

(I) running down system checks and switching off the engine;

(J) parking, security and picketing;

(K) completion of authorisation sheet and serviceability documents.

(iv) Exercise 3: Air experience:

(A) to introduce the student to rotary wing flight;

(B) flight exercise.

(v) Exercise 4: Effects of controls:

(A) function of flight controls, primary and secondary effect;

(B) effects of:

(a) air speed;

(b) power changes (torque);

(c) yaw (sideslip);

(d) disc loading (bank and flare);

(e) controls of selecting hydraulics on/off;

(f) control friction.

(C) instruments;

(D) use of carburettor heat or anti-icing control.

(vi) Exercise 5: Power and attitude changes:

(A) relationship between cyclic control position, disc attitude, fuselage attitude and air speed;

(B) flapback;

(C) power required diagram in relation to air speed;

(D) power and air speed changes in level flight;

(E) use of instruments for precision;

(F) engine and air speed limitations.

(vii) Exercise 6: Straight and level:

(A) at normal cruising power, attaining and maintaining straight and level flight;

(B) control in pitch, including use of control friction or trim;

(C) maintaining direction and balance, (ball or yawstring use);

(D) setting power for selected air speeds and speed changes;

(E) use of instruments for precision.

(viii) Exercise 7: Climbing:

(A) optimum climb speed, best angle or rate of climb from power required diagram;

(B) initiation, maintaining the normal and maximum rate of climb, levelling off;

(C) levelling off at selected altitudes or heights;

(D) use of instruments for precision.

(ix) Exercise 8: Descending:

(A) optimum descent speed, best angle or rate of descent from power required diagram;

(B) initiation, maintaining and levelling off;

(C) levelling off at selected altitudes or heights;

(D) descent (including effect of power and air speed);

(E) use of instruments for precision.

(x) Exercise 9: Turning:

(A) initiation and maintaining medium level turns;

(B) resuming straight flight;

(C) altitude, bank and co-ordination;

(D) climbing and descending turns and effect on rate of climb or descent;

(E) turns onto selected headings, use of gyro heading indicator and compass;

(F) use of instruments for precision.

(xi) Exercise 10: Basic autorotation:

(A) safety checks, verbal warning and look-out;

(B) entry, development and characteristics;

(C) control of air speed and RRPM, rotor and engine limitations;

(D) effect of AUM, IAS, disc loading, G forces and density altitude;

(E) re-engagement and go-around procedures (throttle over-ride or ERPM control);

(F) vortex condition during recovery;

(G) gentle and medium turns in autorotation;

(H) demonstration of variable flare simulated engine off landing.

(xii) Exercise 11a: Hovering:

(A) demonstrate hover IGE, importance of wind effect and attitude, ground cushion, stability in the hover and effects of over controlling;

(B) student holding cyclic stick only;

(C) student handling collective lever (and throttle) only;

(D) student handling collective lever, (throttle) and pedals;

(E) student handling all controls;

(F) demonstration of ground effect;

(G) demonstration of wind effect;

(H) demonstrate gentle forward running touchdown;

(I) specific hazards for example snow, dust and litter.

(xiii) Exercise 11b: Hover taxiing and spot turns:

(A) revise hovering;

(B) precise ground speed and height control;

(C) effect of wind direction on helicopter attitude and control margin;

(D) control and co-ordination during spot turns;

(E) carefully introduce gentle forward running touchdown.

(xiv) Exercise 11c: Hovering and taxiing emergencies:

(A) Revise hovering and gentle forward running touchdown, explain (demonstrate where applicable) effect of hydraulics failure in the hover;

(B) demonstrate simulated engine failure in the hover and hover taxi;

(C) demonstrate dangers of mishandling and over-pitching.

(xv) Exercise 12: Take-off and landing:

(A) pre-take-off checks or drills;

(B) look-out;

(C) lifting to hover;

(D) after take-off checks;

(E) danger of horizontal movement near ground;

(F) danger of mishandling and overpitching;

(G) landing (without sideways or backwards movement);

(H) after landing checks or drills;

(I) take-off and landing crosswind and downwind.

(xvi) Exercise 13: Transitions from hover to climb and approach to hover:

(A) look-out;

(B) revise take-off and landing;

(C) ground effect, translational lift and its effects;

(D) flapback and its effects;

(E) effect of wind speed and direction during transitions from or to the hover;

(F) the constant angle approach;

(G) demonstration of variable flare simulated engine off landing.

(xvii) Exercise 14a: Circuit, approach and landing:

(A) revise transitions from hover to climb and approach to hover;

(B) circuit procedures, downwind and base leg;

(C) approach and landing with power;

(D) pre-landing checks;

(E) effect of wind on approach and IGE hover;

(F) crosswind approach and landing;

(G) go-around;

(H) noise abatement procedures.

(xviii) Exercise 14b: Steep and limited power approaches and landings:

(A) revise the constant angle approach;

(B) the steep approach (explain danger of high sink rate and low air speed)

(C) limited power approach (explain danger of high speed at touch down);

(D) use of the ground effect;

(E) variable flare simulated engine off landing.

(xix) Exercise 14c: Emergency procedures:

(A) abandoned take-off;

(B) missed approach and go-around;

(C) hydraulic off landing (if applicable);

(D) tail rotor control or tail rotor drive failure (briefing only)

(E) simulated emergencies in the circuit to include:

(a) hydraulics failure;

(b) simulated engine failure on take-off, crosswind, downwind and base leg;

(c) governor failure.

(xx) Exercise 15: First solo:

(A) instructor's briefing, observation of flight and debriefing;

(B) warn of change of attitude from reduced and laterally displaced weight;

(C) warn of low tail, low skid or wheel during hover, landing;

(D) warn of dangers of loss of RRPM and overpitching;

(E) pre-take-off checks;

(F) into wind take-off;

(G) procedures during and after take-off;

(H) normal circuit, approaches and landings;

(I) action if an emergency.

(xxi) Exercise 16: Sideways and backwards hover manoeuvring:

(A) manoeuvring sideways flight heading into wind;

(B) manoeuvring backwards flight heading into wind;

(C) combination of sideways and backwards manoeuvring;

(D) manoeuvring sideways and backwards and heading out of wind;

(E) stability and weather cocking;

(F) recovery from backwards manoeuvring (pitch nose down);

(G) limitations for sideways and backwards manoeuvring.

(xxii) Exercise 17: Spot turns:

(A) revise hovering into wind and downwind;

(B) turn on spot through 360º:

(a) around pilots position;

(b) around tail rotor;

(c) around helicopter geometric centre;

(d) square and safe visibility clearing turn.

(C) rotor RPM control, torque effect, cyclic limiting stops due to CG position and wind speed and direction.

(xxiii) Exercise 18: Hover OGE and vortex ring:

(A) establishing hover OGE;

(B) drift, height or power control;

(C) demonstration of incipient stage of vortex ring, recognition and recovery (from a safe altitude);

(D) loss of tail rotor effectiveness.

(xxiv) Exercise 19: Simulated EOL:

(A) the effect of weight, disc loading, density attitude and RRPM decay;

(B) revise basic autorotation entry;

(C) optimum use of cyclic and collective to control speed or RRPM;

(D) variable flare simulated EOL;

(E) demonstrate constant attitude simulated EOL;

(F) demonstrate simulated EOL from hover or hover taxi;

(G) demonstrate simulated EOL from transition and low level.

(xxv) Exercise 20: Advanced autorotation:

(A) over a selected point at various height and speed;

(B) revise basic autorotation: note ground distance covered;

(C) range autorotation;

(D) low speed autorotation;

(E) constant attitude autorotation (terminate at safe altitude);

(F) 'S' turns;

(G) turns through 180 ° and 360 °;

(H) effects on angles of descent, IAS, RRPM and effect of AUM.

(xxvi) Exercise 21: Practice forced landings:

(A) procedure and choice of the forced landing area;

(B) forced landing checks and crash action;

(C) re-engagement and go-around procedures.

(xxvii) Exercise 22: Steep turns:

(A) steep (level) turns (30 ° bank);

(B) maximum rate turns (45 ° bank if possible);

(C) steep autorotative turns;

(D) faults in the turn: balance, attitude, bank and co-ordination;

(E) RRPM control and disc loading;

(F) vibration and control feedback;

(G) effect of wind at low level.

(xxviii) Exercise 23: Transitions:

(A) revise ground effect, translational lift and flapback;

(B) maintaining constant height, (20-30 ft AGL);

(C) transition from hover to minimum 50 knots IAS and back to hover;

(D) demonstrate effect of wind.

(xxix) Exercise 24: Quick stops:

(A) use of power and controls;

(B) effect of wind;

(C) quick stops into wind;

(D) quick stops from crosswind and downwind terminating into wind;

(E) danger of vortex ring;

(F) danger of high disc loading.

(xxx) Exercise 25a: Navigation:

(A) flight planning:

(a) weather forecast and actuals;

(b) map selection and preparation and use;

(1) choice of route:

(2) controlled airspace, danger and prohibited areas;

(3) safety altitudes and noise abatement considerations.

(c) calculations:

(1) magnetic heading(s) and time(s) en-route;

(2) fuel consumption;

(3) mass and balance.

(d) flight information:

(1) NOTAMs, etc.;

(2) radio frequencies;

(3) selection of alternate landing sites.

(e) helicopter documentation;

(f) notification of the flight:

(1) pre-flight administrative procedures;

(2) flight plan form (where appropriate).

(B) departure:

(a) organisation of cockpit workload;

(b) departure procedures:

(1) altimeter settings;

(2) ATC liaison in controlled or regulated airspace;

(3) setting heading procedure;

(4) noting of ETAs.

(c) maintenance of height or altitude and heading;

(d) revisions of ETA and heading:

(1) 10 ° line, double track and track error and closing angle;

(2) 1 in 60 rule;

(3) amending an ETA.

(e) log keeping;

(f) use of radio;

(g) use of navaids (if fitted);

(h) minimum weather conditions for continuation of flight;

(i) in-flight decisions;

(j) transiting controlled or regulated airspace;

(k) uncertainty of position procedure;

(l) lost procedure.

(C) arrival and aerodrome joining procedure:

(a) ATC liaison in controlled or regulated airspace;

(b) altimeter setting;

(c) entering the traffic pattern;

(d) circuit procedures.

(e) parking;

(f) security of helicopter;

(g) refuelling;

(h) closing of flight plan (if appropriate);

(i) post-flight administrative procedures.

(xxxi) Exercise 25b: Navigation problems at low heights and in reduced visibility:

(A) actions before descending;

(B) hazards (for example obstacles and other aircraft);

(C) difficulties of map reading;

(D) effects of wind and turbulence;

(E) avoidance of noise sensitive areas;

(F) actions in the event of encountering DVE;

(G) decision to divert or conduct precautionary landing;

(H) bad weather circuit and landing;

(I) appropriate procedures and choice of landing area;

(J) precautionary landing.

(xxxii) Exercise 25c: Radio navigation:

(A) use of GNSS:

(a) selection of waypoints;

(b) to or from indications and orientation;

(c) error messages;

(d) hazards of over-reliance on the use of GNSS in the continuation of flight in DVE.

(B) use of VHF omni range:

(a) availability, AIP and frequencies;

(b) selection and identification;

(c) OBS;

(d) to or from indications and orientation;

(e) CDI;

(f) determination of radial;

(g) intercepting and maintaining a radial;

(h) VOR passage;

(i) obtaining a fix from two VORs.

(C) use of ADF equipment: NDBs:

(a) availability, AIP and frequencies;

(b) selection and identification;

(c) orientation relative to the beacon;

(d) homing.

(D) use of VHF/DF:

(a) availability, AIP and frequencies;

(b) RTF procedures and ATC liaison;

(c) obtaining a QDM and homing.

(E) use of en-route or terminal radar:

(a) availability and AIP;

(b) procedures and ATC liaison;

(c) pilots responsibilities;

(d) secondary surveillance radar (if transponder fitted):

(1) transponders;

(2) code selection;

(3) interrogation and reply.

(F) use of DME:

(a) station selection and identification;

(b) modes of operation: distance, groundspeed and time to run.

(xxxiii) Exercise 26: Advanced take-off, landings and transitions:

(A) landing and take-off out of wind (performance reduction);

(B) ground effect, translational lift and directional stability variation when out of wind;

(C) downwind transitions;

(D) vertical take-off over obstacles;

(E) running take-off;

(F) cushion creep take-off;

(G) reconnaissance of landing site;

(H) running landing;

(I) zero speed landing;

(J) crosswind and downwind landings;

(K) steep approach;

(L) go-around.

(xxxiv) Exercise 27: Sloping ground:

(A) limitations and assessing slope angle;

(B) wind and slope relationship: blade and control stops;

(C) effect of CG when on slope;

(D) ground effect on slope and power required;

(E) right skid up slope;

(F) left skid up slope;

(G) nose up slope;

(H) avoidance of dynamic roll over, dangers of soft ground and sideways movement on touchdown;

(I) danger of striking main or tail rotor by harsh control movement near ground.

(xxxv) Exercise 28: Limited power:

(A) take-off power check;

(B) vertical take-off over obstacles;

(C) in-flight power check;

(D) running landing;

(E) zero speed landing;

(F) approach to low hover;

(G) approach to hover;

(H) approach to hover OGE;

(I) steep approach;

(J) go-around.

(xxxvi) Exercise 29: Confined areas:

(A) landing capability and performance assessment;

(B) locating landing site and assessing wind speed and direction;

(C) reconnaissance of landing site;

(D) select markers;

(E) select direction and type of approach;

(F) circuit;

(G) approach to committed point and go-around;

(H) approach;

(I) clearing turn;

(J) landing;

(K) power check and performance assessment in and out of ground effect;

(L) normal take-off to best angle of climb speed;

(M) vertical take-off from hover.

(xxxvii) Exercise 30: Basic instrument flight:

(A) physiological sensations;

(B) instrument appreciation:

(a) attitude instrument flight;

(b) instrument scan.

(C) instrument limitations;

(D) basic manoeuvres:

(a) straight and level at various air speeds and configurations;

(b) climbing and descending;

(c) standard rate turns, climbing and descending, onto selected headings.

(E) recoveries from climbing and descending turns;

(F) recoveries from unusual attitudes.

(xxxviii) Exercise 31a: Night flying (if night rating required):

(A) pre-flight inspection using torch, pan lights, etc.;

(B) take-off (no sideways or backwards manoeuvring);

(C) hover taxi (higher and slower than by day);

(D) transition to climb;

(E) level flight;

(F) approach and transition to hover;

(G) landing;

(H) autorotation;

(I) practice forced landing (with flares if appropriate: simulated);

(J) night emergencies (for example failure of lights, etc.).

(xxxix) Exercise 31b: Night cross-country (if night rating required):

(A) navigation principles as for day cross-country;

(B) map marking (highlighting built-up areas with thicker lines, etc.).

AMC1 FCL.210.As PPL(As) Experience requirements and crediting

Flight instruction for the PPL(AS)

Entry to training

Before being accepted for training an applicant should be informed that the appropriate medical certificate must be obtained before solo flying is permitted.

Flight instruction

(1) The PPL(As) flight instruction syllabus should take into account the principles of threat and error management and cover:

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

(ii) ground manoeuvring, masting and unmasting procedures;

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

(iv) control of the airship by external visual reference;

(v) take-offs and landings;

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

(vii) cross-country flying using visual reference, dead reckoning and radio navigation aids;

(viii) emergency operations, including simulated airship equipment malfunctions;

(ix) operations to, from and transiting controlled aerodromes, compliance with air traffic services procedures, communication procedures and phraseology.

(2) Before allowing the applicant for a PPL(As) to undertake his/her first solo flight, the FI should ensure that the applicant can use R/T communication.

Syllabus of flight instruction

(1) 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:

(i) the applicant's progress and ability;

(ii) the weather conditions affecting the flight;

(iii) the flight time available;

(iv) instructional technique considerations;

(v) the local operating environment;

(vi) applicability of the exercises to the airship.

(2) Each of the exercises involves the need for the applicant to be aware of the needs of good airmanship and look-out, which should be emphasised at all times.

(i) Exercise 1a: Familiarisation with the airship:

(A) characteristics of the airship;

(B) cockpit layout;

(C) systems;

(D) checklists, drills and controls.

(ii) Exercise 1b: Emergency drills:

(A) action if fire on the ground and in the air;

(B) engine cabin and electrical system fire;

(C) systems failure;

(D) escape drills, location and use of emergency equipment and exits.

(iii) Exercise 2: Preparation for and action after flight:

(A) flight authorisation and airship acceptance;

(B) serviceability documents;

(C) equipment required, maps, etc.;

(D) mass and balance;

(E) external checks;

(F) ground crew briefing;

(G) internal checks;

(H) harness, seat or rudder panel adjustments;

(I) starting and warm-up checks;

(J) power checks;

(K) running down system checks and switching off the engine;

(L) parking, security and masting;

(M) completion of authorisation sheet and serviceability documents.

(iv) Exercise 3: Air experience: flight exercise.

(v) Exercise 4: Effects of controls:

(A) primary effects;

(B) further effects;

(C) effects of:

(a) air speed;

(b) power;

(c) trimming controls;

(d) other controls, as applicable.

(D) operation of:

(a) mixture control;

(b) carburettor heat;

(c) cabin heating or ventilation.

(vi) Exercise 5: Ground manoeuvring:

(A) pre-taxi checks;

(B) starting, control of speed and stopping;

(C) engine handling;

(D) masting procedures;

(E) control of direction and turning;

(F) effects of wind;

(G) effects of ground surface;

(H) marshalling signals;

(I) instrument checks;

(J) air traffic control procedures;

(K) emergencies.

(vii) Exercise 6a: Take-off procedures:

(A) pre-take-off checks;

(B) take-off with different static heaviness;

(C) drills during and after take-off;

(D) noise abatement procedures.

(viii) Exercise 6b: Emergencies:

(A) abandoned take-off;

(B) engine failure after take-off;

(C) malfunctions of thrust vector control;

(D) aerodynamic control failures;

(E) electrical and system failures.

(ix) Exercise 7: Climbing:

(A) entry, maintaining the normal and max rate climb and levelling off;

(B) levelling off at selected altitudes;

(C) maximum angle of climb;

(D) maximum rate of climb.

(x) Exercise 8: Straight and level:

(A) attaining and maintaining straight and level flight;

(B) flight at or close to pressure height;

(C) control in pitch, including use of trim;

(D) at selected air speeds (use of power);

(E) during speed changes;

(F) use of instruments for precision.

(xi) Exercise 9: Descending:

(A) entry, maintaining and levelling off;

(B) levelling off at selected altitudes;

(C) maximum rate of descent;

(D) maximum angle of descent;

(E) use of instruments for precision flight.

(xii) Exercise 10: Turning:

(A) entry and maintaining level turns;

(B) resuming straight flight;

(C) faults in the turn;

(D) climbing turns;

(E) descending turns;

(F) turns onto selected headings, use of gyro heading indicator and compass;

(G) use of instruments for precision.

(xiii) Exercise 11: Hovering: hovering manoeuvres (as applicable);

(xiv) Exercise 12a: Approach and landing:

(A) effect of wind on approach and touchdown speeds;

(B) landing with different static heaviness;

(C) missed approach and go-around procedures;

(D) noise abatement procedures.

(xv) Exercise 12b: Emergencies:

(A) aborted approach or go-around;

(B) malfunction of thrust vector control;

(C) envelope emergencies;

(D) fire emergencies;

(E) aerodynamic control failures;

(F) electrical and system failures.

(xvi) Exercise 13: Precautionary landing:

(A) occasions necessitating;

(B) in-flight conditions;

(C) landing area selection;

(D) circuit and approach;

(E) actions after landing;

(xvii) Exercise 14a: Navigation:

(A) flight planning:

(a) weather forecast and actuals;

(b) map selection and preparation:

(1) choice of route;

(2) airspace structure;

(3) sensitive areas;

(4) safety altitudes.

(c) calculations:

(1) magnetic heading(s) and time(s) en-route;
(2) fuel consumption;
(3) mass and balance;
(4) performance.

(d) flight information:
(1) NOTAMs etc.;
(2) radio frequencies;
(3) selection of alternate aerodromes.

(e) airship documentation;

(f) notification of the flight:
(1) pre-flight administrative procedures;
(2) flight plan form.

(B) departure:

(a) organisation of cockpit workload;

(b) departure procedures:
(1) altimeter settings;
(2) ATC liaison in controlled or regulated airspace;
(3) setting heading procedure;
(4) noting of ETAs.

(c) maintenance of altitude and heading;

(d) revisions of ETA and heading;

(e) log keeping;

(f) use of radio;

(g) use of navaids;

(h) minimum weather conditions for continuation of flight;

(i) in-flight decisions;

(j) transiting controlled or regulated airspace;

(k) diversion procedures;

(l) uncertainty of position procedure;

(m) lost procedure.

(C) arrival, aerodrome joining procedure:

(a) ATC liaison in controlled or regulated airspace;

(b) altimeter setting;

(c) entering the traffic pattern;

(d) circuit procedures;

(e) parking or on masting;

(f) security of airship;
(g) refuelling;
(h) closing of flight plan, if appropriate;
(i) post-flight administrative procedures.

(xviii) Exercise 14b: Navigation problems at lower levels and in reduced visibility:
(A) actions before descending;
(B) hazards (for example obstacles, and terrain);
(C) difficulties of map reading;
(D) effects of winds, turbulence and precipitation;
(E) vertical situational awareness;
(F) avoidance of noise sensitive areas;
(G) joining the circuit;
(H) bad weather circuit and landing.

(xix) Exercise 14c: Radio navigation:
(A) use of GNSS
(a) selection of waypoints;
(b) to or from indications and orientation;
(c) error messages.
(B) use of VHF omni range (if applicable):
(a) availability, AIP and frequencies;
(b) selection and identification;
(c) OBS;
(d) to or from indications and orientation;
(e) CDI;
(f) determination of radial;
(g) intercepting and maintaining a radial;
(h) VOR passage;
(i) obtaining a fix from two VORs.
(C) use of ADF equipment: NDBs (if applicable):
(a) availability, AIP and frequencies;
(b) selection and identification;
(c) orientation relative to the beacon;
(d) homing.
(D) use of VHF/DF:
(a) availability, AIP and frequencies;
(b) R/T procedures and ATC liaison;
(c) obtaining a QDM and homing.
(E) use of en-route or terminal radar:

(a) availability and AIP;

(b) procedures and ATC liaison;

(c) pilot's responsibilities;

(d) secondary surveillance radar:

(1) transponders;

(2) code selection;

(3) interrogation and reply.

(F) use of DME (if applicable);

(a) station selection and identification;

(b) modes of operation: distance, groundspeed and time to run.

(xx) Exercise 15: Basic instrument flight:

(A) physiological sensations;

(B) instrument appreciation: attitude instrument flight;

(C) instrument limitations;

(D) basic manoeuvres:

(a) straight and level;

(b) climbing and descending;

(c) turns, climbing and descending, onto selected headings;

(d) recoveries from climbing and descending turns.

BITD

(1) A BITD may be used for flight training for:

(i) flight by reference solely to instruments;

(ii) navigation using radio navigation aids;

(iii) basic instrument flight.

(2) The use of the BITD should be subject to the following:

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

(ii) the record of the parameters of the flight must be available; and an FI(As) should conduct the instruction.

AMC1 FCL.205.S(b) SPL Privileges and conditions

Contents of the proficiency check for the extension of SPL privileges to exercise commercial privileges on a sailplane

The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board.

An applicant should indicate to the FE the checks and duties carried out. Checks should be completed in accordance with the authorised checklist for the sailplane on which the test is being taken.

Flight test tolerance

The applicant should demonstrate the ability to:

(1) operate the sailplane within its limitations;

(2) complete all manoeuvres with smoothness and accuracy;

(3) exercise good judgment and airmanship;

(4) apply aeronautical knowledge;

(5) maintain control of the sailplane at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

Content of the skill test

The applicant should demonstrate his/her skill in at least the winch or aerotow method of launching.

SECTION 1 PRE-FLIGHT OPERATIONS AND TAKE-OFF	
Use of checklist, airmanship, control of sailplane by external visual reference, look- out procedures, etc. apply in all sections.	
a	Pre-flight sailplane (daily) inspection, documentation, NOTAM and weather briefing
b	Verifying in-limits mass and balance and performance calculation
c	Passenger briefing
d	Sailplane servicing compliance
e	Pre-take-off checks
SECTION 2 LAUNCH METHOD **Note: at least for one of the three launch methods all the mentioned items are fully exercised during the skill test.**	
SECTION 2 (a) WINCH OR CAR LAUNCH	
a	Signals before and during launch, including messages to winch driver
b	Initial roll and take-off climb
c	Adequate profile of winch launch
d	Launch failures (simulated)
e	Situational awareness
SECTION 2 (b) AEROTOW LAUNCH	
a	Signals before and during launch, including signals to or communications with tow plane pilot for any problems
b	Initial roll and take-off climb
c	Launch abandonment (simulation only or ‘talk-through’)
d	Correct positioning during straight flight and turns
e	Out of position and recovery
f	Correct release from tow
g	Lookout and airmanship through whole launch phase

SECTION 2 (c) SELF LAUNCH (TMGs excluded)	
a	ATC compliance
b	Aerodrome departure procedures
c	Initial roll and take-off climb
d	Simulated engine failure after take-off
e	Engine shut down and stowage
f	Lookout and airmanship through whole launch phase
SECTION 3 GENERAL AIRWORK	
a	Maintain straight flight: attitude and speed control
b	Steep (45 ° bank) turns, look-out procedures and collision avoidance
c	Turning on to selected headings visually and with use of compass
d	Flight at high angle of attack (critically low air speed)
e	Clean stall and recovery
f	Spin avoidance and recovery
g	Local area navigation and awareness
SECTION 4 CIRCUIT, APPROACH AND LANDING	
a	Aerodrome circuit joining procedure
b	Collision avoidance: look-out procedures
c	Pre-landing checks
d	Circuit, approach control and landing
e	Precision landing (simulation of out-landing: short field)
f	Cross wind landing if suitable conditions available

AMC1 FCL.205.B(b) BPL Privileges and conditions

Contents of the proficiency check for extension of BPL privileges to exercise commercial privileges on a balloon

The take-off site should be chosen by the applicant depending on the actual meteorological conditions, the area which has to be overflown and the possible options for suitable landing sites. The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board. The proficiency check may be conducted in two flights. The total duration of the flight(s) should be at least 60 minutes.

An applicant should indicate to the FE the checks and duties carried out. Checks should be completed in accordance with the flight manual or the authorised checklist for the balloon on which the test is being taken. During pre-flight preparation for the test the applicant should be required to perform crew and passenger briefings and demonstrate crowd control. The load calculation should be performed by the applicant in compliance with the operations manual or flight manual for the balloon used.

Flight test tolerance

The applicant should demonstrate the ability to:

(1) operate the balloon within its limitations;

(2) complete all manoeuvres with smoothness and accuracy;

(3) exercise good judgment and airmanship;

(4) apply aeronautical knowledge;

(5) maintain control of the balloon at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

The following limits are for general guidance. The FE should make allowance for turbulent conditions and the handling qualities and performance of the hot -air balloon used:

Height

(1) normal flight ± 100 ft

(2) with simulated emergency ± 150 ft

Content of the skill test

The contents and sections of the proficiency check set out in this AMC should be used for the extension of BPL privileges to exercise commercial privileges on a hot-air balloon.

SECTION 1 PRE-FLIGHT OPERATIONS, INFLATION AND TAKE-OFF	
Use of checklist, airmanship, control of balloon by external visual reference, look- out procedures, etc. apply in all sections.	
a	Pre-flight documentation, flight planning, NOTAM and weather briefing
b	Balloon inspection and servicing
c	Load calculation
d	Crowd control and crew briefing
e	Passenger briefing
f	Assembly and layout
g	Inflation and pre-take-off procedures
h	Take-off
i	ATC compliance
SECTION 2 GENERAL AIRWORK	
a	Climb to level flight
b	Level flight
c	Descent to level flight
d	Operating at low level
e	ATC compliance
SECTION 3 EN-ROUTE PROCEDURES	

a	Dead reckoning and map reading
b	Marking positions and time
c	Orientation, airspace structure
d	Maintenance of altitude
e	Fuel management
f	Communication with retrieve crew
g	ATC compliance or R/T communication
SECTION 4 APPROACH AND LANDING PROCEDURES	
a	Approach from low level and missed approach and fly on
b	Approach from high level and missed approach and fly on
c	Passenger pre-landing briefing
d	Pre-landing checks
e	Selection of landing field
f	Landing, dragging and deflation
g	ATC compliance or R/T communication
h	Actions after flight
SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES	
This section may be combined with sections 1 through 6	
a	Simulated fire on the ground and in the air
b	Simulated pilot light and burner failures
c	Simulated passenger health problems
d	Other abnormal and emergency procedures as outlined in the appropriate flight manual
e	Oral questions

The contents and sections of the proficiency check set out in this AMC should be used for the extension of BPL privileges to exercise commercial privileges on a gas balloon.

SECTION 1 PRE-FLIGHT OPERATIONS, INFLATION AND TAKE-OFF	
Use of checklist, airmanship, control of balloon by external visual reference, look-out procedures, etc. apply in all sections.	
a	Pre-flight documentation, flight planning and NOTAM and weather briefing
b	Balloon inspection and servicing
c	Load calculation
d	Crowd control and crew briefings
e	Passenger briefing
f	Assembly and layout
g	Inflation and pre-take-off procedures

h	Take-off
i	ATC liaison: compliance
SECTION 2 GENERAL AIRWORK	
a	Climb to level flight
b	Level flight
c	Descent to level flight
d	Operating at low level
e	ATC liaison: compliance
SECTION 3 EN-ROUTE PROCEDURES	
a	Dead reckoning and map reading
b	Marking positions and time
c	Orientation, airspace structure
d	Maintenance of altitude
e	Ballast management
f	Communication with retrieve crew
g	ATC compliance or R/T communication
SECTION 4 APPROACH AND LANDING PROCEDURES	
a	Approach from low level and missed approach and fly on
b	Approach from high level and missed approach and fly on
c	Passenger pre-landing briefing
d	Pre-landing checks
e	Selection of landing field
f	Landing, dragging and deflation
g	ATC compliance or R/T communication
h	Actions after flight
SECTION 5 ABNORMAL AND EMERGENCY PROCEDURES	
This section may be combined with sections 1 through 4	
a	Simulated closed appendix during take-off and climb
b	Simulated parachute or valve failure
c	Simulated passenger health problems
d	Other abnormal and emergency procedures as outlined in the appropriate flight manual
e	Oral questions

AMC1 FCL.225.B BPL Extension of privileges to another balloon class or group

The aim of the flight training is to qualify BPL holders to exercise the privileges on a different class or group of balloons.

The following classes should be recognised:

(1) hot-air balloons;

(2) gas balloons;

(3) hot-air airships.

The following groups should be recognised:

(1) group A:

(i) hot-air balloons and hot-air airships with a maximum envelope capacity of 3 400m³;

(ii) gas balloons with a maximum envelope capacity of 1 260m³.

(2) group B:

(i) hot-air balloons and hot-air airship with an envelope capacity between 3 401m³ and 6 000m³;

(ii) gas balloons with an envelope capacity of more than 1 260m³.

(3) group C:hot-air balloons and hot-air airship with an envelope capacity between 6 001m³ and 10 500m³.

(4) group D: hot-air balloons and hot-air airships with an envelope capacity of more than 10 500m³.

An extension to group B is also valid for group A. The extension for the group C is also valid for the groups A and B. An extension to group D will include the privilege for the other three groups.

The ATO should issue a certificate of satisfactory completion of the instruction to licence endorsement.

Subpart D - Commercial Pilot Licence - CPL

AMC1 FCL.310; FCL.515 (b); FCL.615 (b) Syllabus of Theoretical Knowledge for the ATPL, CPL AND IR

The following tables contain the detailed theoretical knowledge syllabus for the ATPL, CPL and IR.

Aspects related to non-technical skills shall be included in an integrated manner, taking into account the particular risks associated to the licence and the activity.

The applicable items for each licence or rating are marked with 'x'. An 'x' on the main title of a subject means that all the sub-divisions are applicable.

Aeroplanes and helicopters

		Aeroplane		Helicopter			IR
		ATPL	CPL	ATPL /IR	ATPL	CPL	
010 00 00 00	**AIR LAW AND ATC PROCEDURES**	x	x	x	x	x	x
010 01 00 00	INTERNATIONAL LAW: CONVENTIONS, AGREEMENTS AND ORGANISATIONS						
010 02 00 00	AIRWORTHINESS OF AIRCRAFT						
010 03 00 00	AIRCRAFT NATIONALITY AND REGISTRATION MARKS						
010 04 00 00	PERSONNEL LICENSING						
010 05 00 00	RULES OF THE AIR						
010 06 00 00	PROCEDURES FOR AIR NAVIGATION SERVICES: AIRCRAFT OPERATIONS						
010 07 00 00	AIR TRAFFIC SERVICES AND AIR TRAFFIC MANAGEMENT						
010 08 00 00	AERONAUTICAL INFORMATION SERVICE						
010 09 00 00	AERODROMES OR HELIPORTS						
010 10 00 00	FACILITATION						
010 11 00 00	SEARCH AND RESCUE						
010 12 00 00	SECURITY						
010 13 00 00	AIRCRAFT ACCIDENT AND INCIDENT INVESTIGATION						
021 00 00 00	**AIRCRAFT GENERAL KNOWLEDGE: AIRFRAME AND SYSTEMS, ELECTRICS, POWERPLANT AND EMERGENCY EQUIPMENT**	x	x	x	x	x	x

		Aeroplane		Helicopter			IR
		ATPL	CPL	ATPL /IR	ATPL	CPL	
021 01 00 00	SYSTEM DESIGN, LOADS, STRESSES AND MAINTENANCE						
021 02 00 00	AIRFRAME						
021 03 00 00	HYDRAULICS						
021 04 00 00	LANDING GEAR, WHEELS, TYRES AND BRAKES						
021 05 00 00	FLIGHT CONTROLS						
021 06 00 00	PNEUMATICS: PRESSURISATION AND AIR CONDITIONING						
021 07 00 00	ANTI AND DE-ICING SYSTEMS						
021 08 00 00	FUEL SYSTEM						
021 09 00 00	ELECTRICS						
021 10 00 00	PISTON ENGINES						
021 11 00 00	TURBINE ENGINES						
021 12 00 00	PROTECTION AND DETECTION SYSTEMS						
021 13 00 00	OXYGEN SYSTEMS						
021 14 00 00	HELICOPTER: MISCELLANEOUS SYSTEMS						
021 15 00 00	HELICOPTER: ROTOR HEADS						
021 16 00 00	HELICOPTER: TRANSMISSION						
021 17 00 00	HELICOPTER: BLADES						
022 00 00 00	**AIRCRAFT GENERAL KNOWLEDGE: INSTRUMENTATION**	x	x	x	x	x	x
022 01 00 00	SENSORS AND INSTRUMENTS						
022 02 00 00	MEASUREMENT OF AIR DATA PARAMETERS						
022 03 00 00	MAGNETISM: DIRECT READING COMPASS AND FLUX VALVE						
022 04 00 00	GYROSCOPIC INSTRUMENTS						
022 05 00 00	INERTIAL NAVIGATION AND REFERENCE SYSTEMS						

		Aeroplane		Helicopter			IR
		ATPL	CPL	ATPL /IR	ATPL	CPL	
022 06 00 00	AEROPLANE: AUTOMATIC FLIGHT CONTROL SYSTEMS						
022 07 00 00	HELICOPTER: AUTOMATIC FLIGHT CONTROL SYSTEMS						
022 08 00 00	TRIMS, YAW DAMPER AND FLIGHT ENVELOPE PROTECTION						
022 09 00 00	AUTOTHROTTLE: AUTOMATIC THRUST CONTROL SYSTEM						
022 10 00 00	COMMUNICATION SYSTEMS						
022 11 00 00	FMS						
022 12 00 00	ALERTING SYSTEMS AND PROXIMITY SYSTEMS						
022 13 00 00	INTEGRATED INSTRUMENTS: ELECTRONIC DISPLAYS						
022 14 00 00	MAINTENANCE, MONITORING AND RECORDING SYSTEMS						
022 15 00 00	DIGITAL CIRCUITS AND COMPUTERS						
030 00 00 00	**FLIGHT PERFORMANCE AND PLANNING**	x	x	x	x	x	
031 00 00 00	**MASS AND BALANCE: AEROPLANES OR HELICOPTERS**	x	x	x	x	x	
031 01 00 00	PURPOSE OF MASS AND BALANCE CONSIDERATIONS						
031 02 00 00	LOADING						
031 03 00 00	FUNDAMENTALS OF CG CALCULATIONS						
031 04 00 00	MASS AND BALANCE DETAILS OF AIRCRAFT						
031 05 00 00	DETERMINATION OF CG POSITION						
031 06 00 00	CARGO HANDLING						
032 00 00 00	**PERFORMANCE: AEROPLANES**	x	x				
032 01 00 00	GENERAL						
032 02 00 00	PERFORMANCE CLASS B: SE AEROPLANES						
032 03 00 00	PERFORMANCE CLASS B: ME AEROPLANES						

		Aeroplane		Helicopter			IR
		ATPL	CPL	ATPL /IR	ATPL	CPL	
032 04 00 00	PERFORMANCE CLASS A : AEROPLANES CERTIFICATED UNDER CS-25 ONLY						
033 00 00 00	**FLIGHT PLANNING AND FLIGHT MONITORING**	x	x	x	x	x	x
033 01 00 00	FLIGHT PLANNING FOR VFR FLIGHTS						
033 02 00 00	FLIGHT PLANNING FOR IFR FLIGHTS						
033 03 00 00	FUEL PLANNING						
033 04 00 00	PRE-FLIGHT PREPARATION						
033 05 00 00	ATS FLIGHT PLAN						
033 06 00 00	FLIGHT MONITORING AND IN-FLIGHT RE-PLANNING						
034 00 00 00	**PERFORMANCE: HELICOPTERS**			x	x	x	
034 01 00 00	GENERAL						
034 02 00 00	PERFORMANCE CLASS 3 SE HELICOPTERS ONLY						
034 03 00 00	PERFORMANCE CLASS 2						
034 04 00 00	PERFORMANCE CLASS 1 HELICOPTERS CERTIFICATED UNDER CS 29 ONLY						
040 00 00 00	**HUMAN PERFORMANCE**	x	x	x	x	x	x
040 01 00 00	HUMAN FACTORS: BASIC CONCEPTS						
040 02 00 00	BASIC AVIATION PHYSIOLOGY AND HEALTH MAINTENANCE						
040 03 00 00	BASIC AVIATION PSYCHOLOGY						
050 00 00 00	**METEOROLOGY**	x	x	x	x	x	x
050 01 00 00	THE ATMOSPHERE						
050 02 00 00	WIND						
050 03 00 00	THERMODYNAMICS						
050 04 00 00	CLOUDS AND FOG						
050 05 00 00	PRECIPITATION						
050 06 00 00	AIR MASSES AND FRONTS						

		Aeroplane		Helicopter			IR
		ATPL	CPL	ATPL /IR	ATPL	CPL	
050 07 00 00	PRESSURE SYSTEMS						
050 08 00 00	CLIMATOLOGY						
050 09 00 00	FLIGHT HAZARDS						
050 10 00 00	METEOROLOGICAL INFORMATION						
060 00 00 00	**NAVIGATION**	x	x	x	x	x	x
061 00 00 00	**GENERAL NAVIGATION**	x	x	x	x	x	x
061 01 00 00	BASICS OF NAVIGATION						
061 02 00 00	MAGNETISM AND COMPASSES						
061 03 00 00	CHARTS						
061 04 00 00	DEAD RECKONING NAVIGATION						
061 05 00 00	IN-FLIGHT NAVIGATION						
062 00 00 00	**RADIO NAVIGATION**	x	x	x	x	x	x
062 01 00 00	BASIC RADIO PROPAGATION THEORY						
062 02 00 00	RADIO AIDS						
062 03 00 00	RADAR						
062 04 00 00	*INTENTIONALLY LEFT BLANK*						
062 05 00 00	AREA NAVIGATION SYSTEMS AND RNAV OR FMS						
062 06 00 00	GNSS						
070 00 00 00	**OPERATIONAL PROCEDURES**	x	x	x	x	x	
071 01 00 00	GENERAL REQUIREMENTS						
071 02 00 00	SPECIAL OPERATIONAL PROCEDURES AND HAZARDS (GENERAL ASPECTS)						
071 03 00 00	HELICOPTER EMERGENCY PROCEDURES						
080 00 00 00	**PRINCIPLES OF FLIGHT**	x	x	x	x	x	
081 00 00 00	**PRINCIPLES OF FLIGHT: AEROPLANE**	x	x				
081 01 00 00	SUBSONIC AERODYNAMICS						
081 02 00 00	HIGH SPEED AERODYNAMICS						

		Aeroplane		Helicopter			IR
		ATPL	CPL	ATPL /IR	ATPL	CPL	
081 03 00 00	*INTENTIONALLY LEFT BLANK*						
081 04 00 00	STABILITY						
081 05 00 00	CONTROL						
081 06 00 00	LIMITATIONS						
081 07 00 00	PROPELLERS						
081 08 00 00	FLIGHT MECHANICS						
082 00 00 00	**PRINCIPLES OF FLIGHT: HELICOPTER**			x	x	x	
082 01 00 00	SUBSONIC AERODYNAMICS						
082 02 00 00	TRANSONIC AERODYNAMICS AND COMPRESSIBILITY EFFECTS						
082 03 00 00	ROTORCRAFT TYPES						
082 04 00 00	MAIN ROTOR AERODYNAMICS						
082 05 00 00	MAIN ROTOR MECHANICS						
082 06 00 00	TAIL ROTORS						
082 07 00 00	EQUILIBRIUM, STABILITY AND CONTROL						
082 08 00 00	HELICOPTER FLIGHT MECHANICS						
090 00 00 00	**COMMUNICATIONS**	x	x	x	x	x	x
091 00 00 00	**VFR COMMUNICATIONS**						
091 01 00 00	DEFINITIONS						
091 02 00 00	GENERAL OPERATING PROCEDURES						
091 03 00 00	RELEVANT WEATHER INFORMATION TERMS (VFR)						
091 04 00 00	ACTION REQUIRED TO BE TAKEN IN CASE OF COMMUNICATION FAILURE						
091 05 00 00	DISTRESS AND URGENCY PROCEDURES						
091 06 00 00	GENERAL PRINCIPLES OF VHF PROPAGATION AND ALLOCATION OF FREQUENCIES						
092 00 00 00	**IFR COMMUNICATIONS**						

		Aeroplane		Helicopter			IR
		ATPL	CPL	ATPL /IR	ATPL	CPL	
092 01 00 00	DEFINITIONS						
092 02 00 00	GENERAL OPERATING PROCEDURES						
092 03 00 00	ACTION REQUIRED TO BE TAKEN IN CASE OF COMMUNICATION FAILURE						
092 04 00 00	DISTRESS AND URGENCY PROCEDURES						
092 05 00 00	RELEVANT WEATHER INFORMATION TERMS (IFR)						
092 06 00 00	GENERAL PRINCIPLES OF VHF PROPAGATION AND ALLOCATION OF FREQUENCIES						
092 07 00 00	MORSE CODE						

Airships

		CPL	IR
1.	**AIR LAW AND ATC PROCEDURES**	**x**	
	INTERNATIONAL LAW: CONVENTIONS, AGREEMENTS AND ORGANISATIONS		
	AIRWORTHINESS OF AIRCRAFT		
	AIRCRAFT NATIONALITY AND REGISTRATION MARKS		
	PERSONNEL LICENSING		x
	RULES OF THE AIR		x
	PROCEDURES FOR AIR NAVIGATION SERVICES: AIRCRAFT OPERATIONS		x
	AIR TRAFFIC SERVICES AND AIR TRAFFIC MANAGEMENT		x
	AERONAUTICAL INFORMATION SERVICE		x
	AERODROMES		x
	FACILITATION		
	SEARCH AND RESCUE		
	SECURITY		
	AIRCRAFT ACCIDENT AND INCIDENT INVESTIGATION		
2.	**AIRSHIP GENERAL KNOWLEDGE: ENVELOPE, AIRFRAME AND SYSTEMS, ELECTRICS, POWERPLANT AND EMERGENCY EQUIPMENT**	**x**	

		CPL	IR
	DESIGN, MATERIALS, LOADS AND STRESSES		
	ENVELOPE AND AIRBAGS		
	FRAMEWORK		
	GONDOLA		
	FLIGHT CONTROLS		
	LANDING GEAR		
	HYDRAULICS AND PNEUMATICS		
	HEATING AND AIR CONDITIONING		
	FUEL SYSTEM		
	PISTON ENGINES		
	TURBINE ENGINES (BASICS)		
	ELECTRICS		
	FIRE PROTECTION AND DETECTION SYSTEMS		
	MAINTENANCE		
3.	**AIRSHIP GENERAL KNOWLEDGE: INSTRUMENTATION**	**x**	
	SENSORS AND INSTRUMENTS		
	MEASUREMENT OF AIR DATA AND GAS PARAMETERS		
	MAGNETISM: DIRECT READING COMPASS AND FLUX VALVE		
	GYROSCOPIC INSTRUMENTS		
	COMMUNICATION SYSTEMS		
	ALERTING SYSTEMS		
	INTEGRATED INSTRUMENTS: ELECTRONIC DISPLAYS		
	FLIGHT MANAGEMENT SYSTEM (GENERAL BASICS)		
	DIGITAL CIRCUITS AND COMPUTERS		
4.	**FLIGHT PERFORMANCE AND PLANNING**	**x**	
4.1.	**MASS AND BALANCE: AIRSHIPS**	**x**	
	PURPOSE OF MASS AND BALANCE CONSIDERATIONS		
	LOADING		

		CPL	IR
	FUNDAMENTALS OF CG CALCULATIONS		
	MASS AND BALANCE DETAILS OF AIRCRAFT		
	DETERMINATION OF CG POSITION		
	PASSENGER, CARGO AND BALLAST HANDLING		
4.2.	**FLIGHT PLANNING AND FLIGHT MONITORING**		
	FLIGHT PLANNING FOR VFR FLIGHTS	x	
	FLIGHT PLANNING FOR IFR FLIGHTS		x
	FUEL PLANNING	x	x
	PRE-FLIGHT PREPARATION	x	x
	ATS FLIGHT PLAN	x	x
	FLIGHT MONITORING AND IN-FLIGHT RE-PLANNING	x	x
4.3.	**PERFORMANCE: AIRSHIPS**	**x**	
	AIRWORTHINESS REQUIREMENTS		
	BASICS OF AIRSHIP PERFORMANCE		
	DEFINITIONS AND TERMS		
	STAGES OF FLIGHT		
	USE OF FLIGHT MANUAL		
5.	**HUMAN PERFORMANCE**	**x**	
	HUMAN FACTORS: BASIC CONCEPTS		
	BASIC AVIATION PHYSIOLOGY AND HEALTH MAINTENANCE		
	BASIC AVIATION PSYCHOLOGY		
6.	**METEOROLOGY**	**x**	
	THE ATMOSPHERE		
	WIND		
	THERMODYNAMICS		
	CLOUDS AND FOG		
	PRECIPITATION		
	AIR MASSES AND FRONTS		

		CPL	IR
	PRESSURE SYSTEMS		
	CLIMATOLOGY		
	FLIGHT HAZARDS		
	METEOROLOGICAL INFORMATION		
7.	**NAVIGATION**		
7.1.	**GENERAL NAVIGATION**	**x**	
	BASICS OF NAVIGATION		
	MAGNETISM AND COMPASSES		
	CHARTS		
	DR NAVIGATION		
	IN-FLIGHT NAVIGATION		
7.2.	**RADIO NAVIGATION**		
	BASIC RADIO PROPAGATION THEORY	x	x
	RADIO AIDS	x	x
	RADAR	x	x
	INTENTIONALLY LEFT BLANK		
	AREA NAVIGATION SYSTEMS AND RNAV/FMS		x
	GNSS	x	x
8.	**OPERATIONAL PROCEDURES AIRSHIP**	**x**	
	GENERAL REQUIREMENTS		
	SPECIAL OPERATIONAL PROCEDURES AND HAZARDS (GENERAL ASPECTS)		
	EMERGENCY PROCEDURES		
9.	**PRINCIPLES OF FLIGHT**	**x**	
9.1.	**PRINCIPLES OF FLIGHT: AIRSHIPS**	**x**	
	BASICS OF AEROSTATICS		
	BASICS OF SUBSONIC AERODYNAMICS		
	AERODYNAMICS OF AIRSHIPS		
	STABILITY		

		CPL	IR
	CONTROLLABILITY		
	LIMITATIONS		
	PROPELLERS		
	BASICS OF AIRSHIP FLIGHT MECHANICS		
10.	**COMMUNICATIONS**		
10.1.	**VFR COMMUNICATIONS**	**x**	
	DEFINITIONS	x	
	GENERAL OPERATING PROCEDURES	x	
	RELEVANT WEATHER INFORMATION TERMS (VFR)	x	
	ACTION REQUIRED TO BE TAKEN IN CASE OF COMMUNICATION FAILURE	x	
	DISTRESS AND URGENCY PROCEDURES	x	
	GENERAL PRINCIPLES OF VHF PROPAGATION AND ALLOCATION OF FREQUENCIES	x	
10.2.	**IFR COMMUNICATIONS**		
	DEFINITIONS		x
	GENERAL OPERATING PROCEDURES		x
	ACTION REQUIRED TO BE TAKEN IN CASE OF COMMUNICATION FAILURE		x
	DISTRESS AND URGENCY PROCEDURES		x
	RELEVANT WEATHER INFORMATION TERMS (IFR)		x
	GENERAL PRINCIPLES OF VHF PROPAGATION AND ALLOCATION OF FREQUENCIES		x
	MORSE CODE		x

GM1 FCL.310; FCL.515(b); FCL.615(b) Theoretical knowledge examinations

EXPLANATION OF THE VERBS USED IN THE BENJAMIN BLOOM TAXONOMY

(a) The depth or level of learning to be achieved during the training and the corresponding level of attainment to be examined or assessed is based on the following taxonomy. In each case, the level of knowledge or skill is signified by the learning objective (LO) verb.

(b) The majority of the LOs relate to the cognitive domain. The taxonomy described by B. Bloom (1956) and Anderson & Krathwohl (2001) has been used as the standard.

(c) The six sequential increasing levels of required cognitive learning are identified by the LO verb. Hence the lowest level 'remember' is signified by verbs such as 'state', 'list', 'define' and 'recall' whilst the next higher level of 'understand' is signified by verbs such as 'describe' and 'explain'. The third level of 'apply' is signified by the verbs 'calculate', 'interpret', 'relate' and 'solve'. However, the higher levels of 'analyse', which would be signified by the verbs 'plan' or 'discuss' and 'evaluate' and 'create' are less common due at least partially to questions presently possible in the ECQB examination.

(d) The LOs used in Area 100 KSA differ in that they require a combination of knowledge and skills. However, the 'skill' level does not relate to Bloom's psychomotor taxonomy but is more closely aligned to the higher taxonomy levels required in medicine, because knowledge and skills must be combined by the student pilot in a strategy.

(e) The verbs 'demonstrate' and 'show', with their meanings defined below, have therefore been used to supplement the cognitive LO verbs for the Area 100 KSA LOs.

(1) 'Demonstrate' means the selection and use of the appropriate knowledge, skills and attitudes within a strategy to achieve an effective outcome. It signifies a high taxonomy level and would normally be assessed using multiple indicators from more than one core competency.

(2) 'Show' means the attainment of knowledge, skill or attitude. It signifies a lower taxonomy level than 'demonstrate' and would normally be assessed by a single indicator.'

Subpart F - Airline Transport Pilot Licence - ATPL

AMC1 FCL.510.A (b)(1) ATPL(A) Prerequisites, experience and crediting

Equivalent requirements for CS-25 and CS-23 commuter category are the JAR/FAR-25 transport category, JAR/FAR-23 commuter category, or BCAR or AIR 2051.

AMC1 FCL.520.A; FCL.520.H

ATPL skill test

The ATPL skill test may serve at the same time as a skill test for the issue of the licence and a proficiency check for the revalidation of the type rating for the aircraft used in the test and may be combined with the skill test for the issue of a MP type rating.

Subpart G - Instrument Rating - IR

AMC1 FCL.615(b) IR Theoretical knowledge and flight instruction

Syllabus of theoretical knowledge for the IR following the competency-based modular course and EIR

The following tables contain the detailed theoretical knowledge syllabus for the IR following the competency-based modular route (IR(A)) and the EIR.

Aspects related to non-technical skills should be included in an integrated manner, taking into account the particular risks associated to the licence and the activity.

The applicant who has completed a modular IR(A) course according to Appendix 6 A and passed the IR(A) theoretical knowledge examination should be fully credited towards the requirements of theoretical knowledge instruction and examination for a competency- based IR(A) or EIR within the validity period of the examination. An applicant wishing to transfer to a competency-based IR(A) or EIR course during a modular IR(A) course should be credited towards the requirements of theoretical knowledge instruction and examination for a competency-based IR(A) or EIR for those subjects or theory items already completed.

The applicant for an IR(A) who has completed an EIR theoretical knowledge course and passed the EIR theoretical knowledge examination according to FCL.825 should be fully credited towards the requirements of theoretical knowledge instruction and examination for an competency-based IR(A) according to Annex 6 Aa.

010 00 00 00	AIR LAW
010 04 00 00	PERSONNEL LICENSING
010 05 00 00	RULES OF THE AIR
010 06 00 00	PROCEDURES FOR AIR NAVIGATION SERVICES — AIRCRAFT OPERATIONS (PANS OPS)
010 07 00 00	AIR TRAFFIC SERVICES AND AIR TRAFFIC MANAGEMENT
010 08 00 00	AERONAUTICAL INFORMATION SERVICE
010 09 00 00	AERODROMES (ICAO Annex 14, Volume I, Aerodrome Design and Operations)
022 00 00 00	AIRCRAFT GENERAL KNOWLEDGE — INSTRUMENTATION
022 02 00 00	MEASUREMENT OF AIR DATA PARAMETERS
022 04 00 00	GYROSCOPIC INSTRUMENTS
022 13 00 00	INTEGRATED INSTRUMENTS — ELECTRONIC DISPLAYS
033 00 00 00	FLIGHT PLANNING AND MONITORING
033 02 00 00	FLIGHT PLANNING FOR IFR FLIGHTS
033 03 00 00	FUEL PLANNING
033 04 00 00	PRE-FLIGHT PREPARATION

033 05 00 00	ICAO FLIGHT PLAN (ATS FLIGHT PLAN)
040 00 00 00	HUMAN PERFORMANCE
040 01 00 00	HUMAN FACTORS: BASIC CONCEPTS
040 02 00 00	BASIC AVIATION PHYSIOLOGY AND HEALTH MAINTENANCE
040 03 00 00	BASIC AVIATION PSYCHOLOGY
050 00 00 00	METEOROLOGY
050 01 00 00	THE ATMOSPHERE
050 02 00 00	WIND
050 03 00 00	THERMODYNAMICS
050 04 00 00	CLOUDS AND FOG
050 05 00 00	PRECIPITATION
050 06 00 00	AIR MASSES AND FRONTS
050 07 00 00	PRESSURE SYSTEMS
050 08 00 0	CLIMATOLOGY
050 09 00 00	FLIGHT HAZARDS
050 10 00 00	METEOROLOGICAL INFORMATION
062 00 00 00	RADIO NAVIGATION
062 02 00 00	RADIO AIDS
062 03 00 00	RADAR
062 05 00 00	AREA NAVIGATION SYSTEMS, RNAV/FMS
092 00 00 00	IFR COMMUNICATIONS
092 01 00 00	DEFINITIONS
092 02 00 00	GENERAL OPERATING PROCEDURES
092 03 00 00	ACTION REQUIRED TO BE TAKEN IN CASE OF COMMUNICATION FAILURE
092 04 00 00	DISTRESS AND URGENCY PROCEDURES
092 05 00 00	RELEVANT WEATHER INFORMATION TERM
092 06 00 00	GENERAL PRINCIPLES OF VHF PROPAGATION AND ALLOCATION OF FREQUENCIES
092 07 00 00	MORSE CODE

AMC2 FCL.615(b) IR Theoretical knowledge and flight instruction

Detailed theoretical knowledge syllabus and learning objectives

Subject Air Law (Competency-based modular training course (CB-IR(A)) for instrument rating according to Appendix 6 Aa and en-route instrument rating (EIR) course according to FCL.825)

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
010 00 00 00	**AIR LAW**	
010 04 00 00	**PERSONNEL LICENSING**	
010 04 02 00	Regulation on Air Crew — Part-FCL	
010 04 02 01	Definitions	
LO	Define the following: Category of aircraft, cross country flight, dual instruction time, flight time, flight time as SPIC, instrument time, instrument flight time, instrument ground time, MCC, multi-pilot aeroplanes, night, PPL, CPL, proficiency check, rating, renewal, revalidation, skill test, solo flight time, type of aircraft	x
010 04 02 02	Part-FCL	
LO	Name the content of PART-FCL	x
010 04 02 05	Ratings	
LO	Explain the requirements for plus validity and privileges of Instrument Ratings	x
010 05 00 00	**RULES OF THE AIR**	
010 05 02 00	Applicability of the Rules of the Air	
LO	Explain the duties of the PIC concerning pre-flight actions in case of an IFR flight	x
010 05 03 00	General Rules	
LO	Describe the requirements when carrying out simulated instrument flights	x
LO	Explain why a time check has to be obtained before flight	x
LO	Describe the required actions to be carried out, if the continuation of a controlled VFR flight in VMC is not practicable anymore	x
LO	Describe the provisions for transmitting a position report to the appropriate ATS Unit including time of transmission and normal content of the message	x
LO	Describe the necessary action when an aircraft is experiencing a COM failure	x
010 05 05 00	Instrument Flight Rules (IFR)	
LO	Describe the Instrument Flight Rules as contained in Chapter 5 of ICAO Annex 2	x
010 06 00 00	**PROCEDURES FOR AIR NAVIGATION SERVICES — AIRCRAFT OPERATIONS (PANS OPS)**	
010 06 03 00	Departure procedures	

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
010 06 03 01	General criteria (assuming all engines operating)	
LO	Name the factors dictating the design of instrument departure procedures	x
LO	Explain in which situations the criteria for omni-directional departures are applied	x
010 06 03 02	Standard Instrument Departures (SIDs)	
LO	Define the terms ‘straight departure’ and ‘turning departure’	x
LO	State the responsibility of the operator when unable to utilize the published departure procedures	x
010 06 03 03	Omni-directional departures	
LO	Explain when the ‘omni-directional method’ is used for departure	x
LO	Describe the solutions when an omni-directional procedures is not possible	x
010 06 03 04	Published information	
LO	State the conditions for the publication of a SID and/or RNAV route	x
LO	Describe how omni-directional departures are expressed in the appropriate publication	x
010 06 03 05	Area Navigation (RNAV) Departure Procedures and RNP-based Departures	
LO	Explain the relationship between RNAV/RNP-based departure procedures and those for approaches	x
010 06 04 00	Approach procedures	
010 06 04 01	General criteria	
LO	Name the five possible segments of an instrument approach procedure	x
LO	Give reasons for establishing aircraft categories for the approach	x
LO	State the maximum angle between the final approach track and the extended RWY centre-line to still consider a non-precision-approach as being a ‘Straight-In Approach’	x
LO	State the minimum obstacle clearance provided by the minimum sector altitudes (MSA) established for an aerodrome	x
LO	Describe the point of origin, shape, size and sub-divisions of the area used for MSAs	x
LO	State that a pilot shall apply wind corrections when carrying out an instrument approach procedures	x
LO	Name the most significant performance factor influencing the conduct of Instrument Approach Procedures	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	Explain why a Pilot should not descend below OCA/Hs which are established for -precision approach procedures -a non-precision approach procedures — visual (circling) procedures	x
LO	Describe in general terms, the relevant factors for the calculation of operational minima	x
LO	Translate the following abbreviations into plain language: DA, DH, OCA, OCH, MDA, MDH, MOC, DA/H, OCA/H, MDA/H	x
LO	Explain the relationship between the terms: DA, DH, OCA, OCH, MDA, MDH, MOC, DA/H, OCA/H, MDA/H	x
010 06 04 02	Approach Procedure Design	
LO	Describe how the vertical cross-section for each of the five approach segments is broken down into the various areas	x
LO	State within which area of the cross-section the Minimum Obstacle Clearance (MOC) is provided for the whole width of the area	x
LO	Define the terms IAF, IF, FAF, MAPt and TP	x
LO	State the accuracy of facilities providing track (VOR, ILS, NDB)	x
LO	Describe the basic information relating to approach area splays	x
LO	State the optimum descent gradient (preferred for a precision approach) in degrees and per cent	x
010 06 04 03	Arrival and approach segments	
LO	Name the five standard segments of an instrument APP procedure and state the beginning and end for each of them	x
LO	Describe where an ARR route normally ends	x
LO	State whether or not omni-directional or sector arrivals can be provided	x
LO	Explain the main task for the initial APP segment	x
LO	Describe the maximum angle of interception between the initial APP segment and the intermediate APP segment (provided at the intermediate fix) for a precision APP and a non-precision APP	x
LO	Describe the main task of the intermediate APP segment	x
LO	State the main task of the final APP segment	x
LO	Name the two possible aims of a final APP	x
LO	Explain the term ‘final approach point’ in case of an ILS approach	x
LO	State what happens if an ILS GP becomes inoperative during the APP	x
010 06 04 04	Missed Approach	

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	Describe where outbound timing begins in a holding pattern	x
LO	State where the outbound leg in a holding terminates if the outbound leg is based on DME	x
LO	Describe the three heading entry sectors for entries into a holding pattern	x
LO	Define the terms ‘parallel entry’, ‘offset entry’ and ‘direct entry’	x
LO	Determine the correct entry procedure for a given holding pattern	x
LO	State the still air time for flying the outbound entry heading with or without DME	x
LO	Describe what the pilot is expected to do when clearance is received specifying the time of departure from the holding point	x
010 06 05 02	Obstacle clearance (except table)	
LO	Describe the layout of the basic holding area, entry area and buffer area of a holding pattern	x
LO	State which obstacle clearance is provided by a minimum permissible holding level referring to the holding area, the buffer area (general only) and over high terrain or in mountainous areas	x
010 06 06 00	Altimeter setting procedures	
010 06 06 01	Basic requirements and procedures	
LO	Describe the two main objectives for altimeter settings	x
LO	Define the terms ‘QNH’ and ‘QFE’	x
LO	Describe the different terms of altitude or flight levels respectively which are the references during climb or descent to change the altimeter setting from QNH to 1013.2 hPa and vice versa	x
LO	Define the term ‘Flight Level’ (FL)	x
LO	State where flight level zero shall be located	x
LO	State the interval by which consecutive flight levels shall be separated	x
LO	Describe how flight levels are numbered	x
LO	Define the term ‘Transition Altitude’	x
LO	State how Transition Altitudes shall normally be specified	x
LO	Explain how the height of the Transition Altitude is calculated and expressed in practice	x
LO	State where Transition Altitudes shall be published	x
LO	Define the term ‘Transition Level’	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	State when the Transition Level is normally passed to aircraft	x
LO	State how the vertical position of aircraft shall be expressed at or below the Transition Altitude and Transition Level	x
LO	Define the term 'Transition Layer'	x
LO	Describe when the vertical position of an aircraft passing through the transition layer shall be expressed in terms of flight levels and when in terms of altitude	x
LO	State when the QNH altimeter setting shall be made available to departing aircraft	x
LO	Explain when the vertical separation of aircraft during en-route flight shall be assessed in terms of altitude and when in terms of flight levels	x
LO	Explain when, in air-ground communications during an en-route flight, the vertical position of an aircraft shall be expressed in terms of altitude and when in terms of flight levels	x
LO	Describe why QNH altimeter setting reports should be provided from sufficient locations	x
LO	State how a QNH altimeter setting shall be made available to aircraft approaching a controlled aerodrome for landing	x
LO	State under which circumstances the vertical position of an aircraft above the transition level may be referenced to altitudes	x
010 06 06 02	Procedures for Operators and Pilots	
LO	State the three requirements that altitudes or flight levels selected should have	x
LO	Describe a pre-flight operational test in case of QNH setting and in case of QFE setting including indication (error) tolerances referred to the different test ranges	x
LO	State on which setting at least one altimeter shall be set prior to take off	x
LO	State where during the climb the altimeter setting shall be changed from QNH to 1013.2 hPa	x
LO	Describe when a pilot of an aircraft intending to land at an AD shall obtain the transition level	x
LO	Describe when a pilot of an aircraft intending to land at an AD shall obtain the actual QNH altimeter setting	x
LO	State where the altimeter settings shall be changed from 1013.2 hPa to QNH during descent for landing	x
010 06 07 00	Simultaneous Operation on parallel or near-parallel instrument Runways	
LO	Describe the difference between independent and dependent parallel approaches	x
LO	Describe the following different operations: — Simultaneous instrument departures — Segregated parallel approaches/departures — Semi-mixed and mixed operations	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
010 06 08 00	Secondary surveillance radar (transponder) operating procedures	
010 06 08 01	Operation of transponders	
LO	State when and where the pilot shall operate the transponder	x
LO	State the modes and codes that the pilot shall operate in the absence of any ATC directions or regional air navigation agreements	x
LO	Indicate when the pilot shall operate Mode S	x
LO	State when the pilot shall 'SQUAWK IDENT'	x
LO	State the transponder mode and code to indicate: -a state of emergency -a Communication failure - unlawful interference	x
LO	Describe the consequences of a transponder failure in flight	x
LO	State the primary action of the pilot in the case of an unserviceable transponder before departure when no repair or replacement at this aerodrome is possible	x
010 06 08 02	Operation of ACAS equipment	
LO	Describe the main reason for using ACAS	x
010 07 00 00	**AIR TRAFFIC SERVICES AND AIR TRAFFIC MANAGEMENT**	
010 07 01 00	ICAO Annex 11 — Air Traffic Services	
010 07 01 03	Airspace	
LO	Understand the various rules and services that apply in the various classes of airspace	x
010 07 01 04	Air Traffic Control Services	
LO	Name the ATS units providing ATC service (area control service, approach control service, aerodrome control service)	x
LO	Describe which unit(s) may be assigned with the task to provide specified services on the apron	x
LO	Name the purpose of clearances issued by an ATC unit	x
LO	Describe the aim of clearances issued by ATC with regard to IFR, VFR or special VFR flights and refer to the different airspaces	x
LO	List the various (five possible) parts of an ATC clearance	x
LO	State how ATC shall react when it becomes apparent that traffic, additional to that one already accepted, cannot be accommodated within a given period of time at a particular location or in a particular area, or can only be accommodated at a given rate	x
010 07 02 00	ICAO Document 4444 — Air Traffic Management	

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
010 07 02 01	Foreword (Scope and purpose)	
LO	State whether or not a clearance issued by ATC units does include prevention of collision with terrain and if there is an exception to this, name the exception	x
010 07 02 03	ATS System Capacity and Air Traffic Flow Management	
LO	Explain when and where an air traffic flow management (ATFM) service shall be implemented	x
010 07 02 05	ATC Clearances	
LO	Explain 'the sole scope and purpose' of an ATC clearance	x
LO	State on which information the issue of an ATC clearance is based	x
LO	Describe what a PIC should do if an ATC clearance is not suitable	x
LO	Indicate who bears the responsibility for maintaining applicable rules and regulations whilst flying under the control of an ATC unit	x
LO	Explain what is meant by the expression 'clearance limit'	x
LO	Explain the meaning of the phrases 'cleared via flight planned route', 'cleared via (designation) departure' and 'cleared via (designation) arrival' in an ATC clearance.	x
LO	List which items of an ATC clearance shall always be read back by the flight crew	x
010 07 02 06	Horizontal Speed Control Instructions	
LO	Explain the reason for speed control by ATC	x
LO	Define the maximum speed changes that ATC may impose	x
LO	State within which distance from the threshold the PIC must not expect any kind of speed control	x
010 07 02 07	Change from IFR to VFR flight	
LO	Explain how the change from IFR to VFR can be initiated by the PIC	x
LO	Indicate the expected reaction of the appropriate ATC unit upon a request to change from IFR to VFR	x
010 07 02 09	Altimeter Setting Procedures	
LO	Define the following terms: — transition level — transition layer — and transition altitude	x
LO	Indicate how the vertical position of an aircraft in the vicinity of an aerodrome shall be expressed at or below the transition altitude, at or above the transition level and while climbing or descending through the transition layer	x
LO	Describe when the height of an aircraft using QFE during an NDB approach is referred to the landing threshold instead of the aerodrome elevation	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	Indicate how far altimeter settings provided to aircraft shall be rounded up or down	x
LO	Define the expression 'lowest usable flight level'	x
LO	Determine how the vertical position of an aircraft on a flight en-route is expressed at or above the lowest usable flight level and below the lowest usable flight level	x
LO	State who establishes the transition level to be used in the vicinity of an aerodrome	x
LO	Decide how and when a flight crew shall be informed about the transition level	x
LO	State whether or not the pilot can request the transition level to be included in the approach clearance	x
LO	State in what kind of clearance the QNH altimeter setting shall be included	x
010 07 02 10	Position Reporting	
LO	Describe when position reports shall be made by an aircraft flying on routes defined by designated significant points	x
LO	List the six items that are normally included in a voice position report	x
LO	Name the requirements for using a simplified position report with Flight level, next position (and time over) and ensuing significant points omitted	x
LO	Name the item of a position report which must be forwarded to ATC with the initial call after changing to a new frequency	x
LO	Indicate the item of a position report which may be omitted if SSR Mode C is used	x
010 07 02 12	Separation methods and minima	
LO	Explain the general provisions for the separation of controlled traffic	x
LO	Name the different kind of separation used in aviation	x
LO	Understand the difference between the type of separation provided within the various classes of airspace and between the various types of flight	x
LO	State who is responsible for the avoidance of collision with other aircraft when operating in VMC	x
LO	State the ICAO documents in which details of current separation minima are prescribed	x
LO	Describe how vertical separation is obtained	x
LO	State the required vertical separation minimum	x
LO	Describe how the cruising levels of aircraft flying to the same destination and the expected approach sequence are correlated with each other	x
LO	Name the conditions that must be adhered to, when two aircraft are cleared to maintain a specified vertical separation between them during climb or descent	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	List the two main methods for horizontal separation	x
LO	Describe how lateral separation of aircraft at the same level may be obtained	x
LO	Explain the term 'Geographical Separation'	x
LO	Describe track separation between aircraft using the same navigation aid or method	x
LO	Describe the three basic means for the establishment of longitudinal separation	x
LO	Describe the circumstances under which a reduction in separation minima may be allowed	x
LO	Indicate the standard horizontal radar separation in NM	x
LO	State the wake turbulence radar separation for aircraft in the APP and DEP phases of a flight when an aircraft is operating directly behind another aircraft at the same ALT or less than 300 m (1000 ft) below	x
010 07 02 13	Separation in the vicinity of aerodromes	
LO	State the condition to enable ATC to initiate a visual approach for an IFR flight	x
LO	Indicate whether or not separation will be provided by ATC between an aircraft executing a visual approach and other arriving or departing aircraft	x
LO	State in which case when the flight crew are not familiar with the instrument approach procedure being carried out, that only the final approach track has to be forwarded to them by ATC	x
LO	Describe which flight level should be assigned to an aircraft first arriving over a holding fix for landing	x
LO	Talk about the priority that will be given to aircraft for a landing	x
LO	Understand the situation when a pilot of an aircraft in an approach sequence indicates his intention to hold for weather improvements	x
LO	Explain the term 'Expected Approach Time' and the procedures for its use	x
LO	State the reasons which could probably lead to the decision to use another take-off or landing direction than the one into the wind	x
LO	Name the possible consequences for a PIC if the 'RWY-in-use' is not considered suitable for the operation involved	x
010 07 02 14	Miscellaneous separation procedures	
LO	Be familiar with the separation of aircraft holding in flight	x
LO	Be familiar with the minimum separation between departing aircraft	x
LO	Be familiar with the minimum separation between departing and arriving aircraft	x
LO	Be familiar with the non-radar wake turbulence longitudinal separation minima	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	Know about a clearance to 'maintain own separation' while in VMC	x
LO	Give a brief description of 'Essential Traffic' and 'Essential Traffic Information'	x
LO	Describe the circumstances under which a reduction in separation minima may be allowed	x
010 07 02 15	Arriving and Departing aircraft	
LO	List the elements of information which shall be transmitted to an aircraft as early as practicable if an approach for landing is intended	x
LO	List the information to be transmitted to an aircraft at the commencement of final approach	x
LO	List the information to be transmitted to an aircraft during final approach	x
LO	State the sequence of priority between aircraft landing (or in the final stage of an approach to land) and aircraft intending to depart	x
LO	Explain the factors that influence the approach sequence	x
LO	State the significant changes in the meteorological conditions in the take-off or climb-out area that shall be transmitted without delay to a departing aircraft.	x
LO	Describe what information shall be forwarded to a departing aircraft as far as visual or non-visual aids are concerned	x
LO	State the significant changes that shall be transmitted as early as practicable to an arriving aircraft, particularly changes in the meteorological conditions.	x
010 07 02 16	Procedures for Aerodrome Control Service	
LO	Describe the general tasks of the Aerodrome Control Tower (TWR) when issuing information and clearances to aircraft under its control	x
LO	List for which aircraft and their given positions or flight situations the TWR shall prevent collisions	x
LO	Name the operational failure or irregularity of AD equipment which shall be reported to the TWR immediately	x
LO	State that, after a given period of time, the TWR shall report to the ACC or FIC if an aircraft does not land as expected	x
LO	Describe the procedures to be observed by the TWR whenever VFR operations are suspended	x
010 07 02 17	Radar services	
LO	State to what extent the use of radar in air traffic services may be limited	x
LO	State what radar derived information shall be available for display to the controller as a minimum	x
LO	Name the two basic identification procedures used with radar	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	Define the term 'PSR'	x
LO	Describe the circumstances under which an aircraft provided with radar service should be informed of its position	x
LO	List the possible forms of position information passed to the aircraft by radar services	x
LO	Define the term 'radar vectoring'	x
LO	State the aims of radar vectoring as shown in ICAO Doc 4444	x
LO	State how radar vectoring shall be achieved	x
LO	Describe the information which shall be given to an aircraft when radar vectoring is terminated and the pilot is instructed to resume own navigation	x
LO	Explain the procedures for the conduct of Surveillance Radar Approaches (SRA)	x
LO	Describe what kind of action (concerning the transponder) the pilot is expected to perform in case of emergency if he has previously been directed by ATC to operate the transponder on a specific code	x
010 07 02 19	Procedures related to emergencies, communication failure and contingencies	
LO	State the Mode and Code of SSR equipment a pilot might operate in a (general) state of emergency or (specifically) in case the aircraft is subject to unlawful interference	x
LO	State the special rights an aircraft in a state of emergency can expect from ATC	x
LO	Describe the expected action of aircraft after receiving a broadcast from ATS concerning the emergency descent of an aircraft	x
LO	State how it can be ascertained, in case of a failure of two-way communication, whether the aircraft is able to receive transmissions from the ATS unit	x
LO	Explain the assumption based on which separation shall be maintained if an aircraft is known to experience a COM failure in VMC or in IMC	x
LO	State on which frequencies appropriate information, for an aircraft encountering two way COM failure, will be sent by ATS	x
LO	Describe the expected activities of an ATS-unit after having learned that an aircraft is being intercepted in or outside its area of responsibility	x
LO	State what is meant by the expression 'Strayed aircraft' and 'Unidentified aircraft'	x
010 08 00 00	**AERONAUTICAL INFORMATION SERVICE**	
010 08 02 00	Definitions in ICAO Annex 15	
LO	Recall the following definitions: Aeronautical Information Circular (AIC), Aeronautical Information Publication (AIP), AIP amendment, AIP supplement, AIRAC, danger area, Integrated Aeronautical Information Package, international airport, international NOTAM office (NOF), manoeuvring area, movement area, NOTAM, pre-flight information bulletin (PIB), prohibited area, restricted area, SNOWTAM, ASHTAM	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
010 08 04 00	Integrated Aeronautical Information Package	
010 08 04 01	Aeronautical Information Publications (AIP)	
LO	State in which main part of the AIP the following information can be found: — Differences from ICAO Standards, Recommended Practices and Procedures — Location indicators, aeronautical information services, minimum flight altitude, VOLMET service, SIGMET service — General rules and procedures (especially general rules, VFR, IFR, ALT setting procedure, interception of civil aircraft, unlawful interference, air traffic incidents), — ATS airspace (especially FIR, UIR, TMA), — ATS routes (especially lower ATS routes, upper ATS routes, area navigation routes) — Aerodrome data including Aprons, TWYs and check locations/positions data — Navigation warnings (especially prohibited, restricted and danger areas) — aircraft instruments, equipment and flight documents — AD surface movement guidance and control system and markings, — RWY physical characteristics, declared distances, APP and RWY lighting, — AD radio navigation and landing aids, — charts related to an AD — entry, transit and departure of aircraft, passengers, crew and cargo	x
010 08 04 02	NOTAMs	
LO	Describe how information shall be published which in principal would belong to NOTAMs but includes extensive text and/or graphics	x
LO	Summarise essential information which lead to the issuance of a NOTAM	x
LO	Explain how information regarding snow, ice and standing water on AD pavements shall be reported	x
010 08 04 03	Aeronautical Information Regulation and Control (AIRAC)	
LO	List the circumstances of which the information concerned shall or should be distributed as AIRAC	x
LO	State the sequence in which AIRACs shall be issued and state how many days in advance of the effective date the information shall be distributed by AIS	x
010 08 04 05	Pre-flight and Post-flight Information/Data	
LO	Describe how a recapitulation of current NOTAM and other information of urgent character shall be made available to flight crews	x
010 09 00 00	**AERODROMES (ICAO Annex 14, Volume I, Aerodrome Design and Operations)**	
010 09 02 00	Aerodrome data	
010 09 02 01	Aerodrome Reference Point	
LO	Describe where the aerodrome reference point shall be located and where it shall normally remain	x
010 09 03 00	Physical Characteristics	
010 09 03 01	Runways	
LO	Acquaint yourself with the general considerations concerning runways associated with a Stopway or Clearway	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
010 09 03 02	Runway Strips	
LO	Explain the term ‘Runway strip’	x
010 09 03 03	Runway end safety area	
LO	Explain the term ‘RWY end safety area’	x
010 09 03 04	Clearway	
LO	Explain the term ‘Clearway’	x
010 09 03 05	Stopway	
LO	Explain the term ‘Stopway’	x
010 09 03 07	Taxiways	
LO	Describe where runway-holding positions shall be established	x
010 09 04 00	Visual aids for navigation	
010 09 04 02	Markings	
LO	Name the colours used for the various markings (RWY, TWY, aircraft stands, apron safety lines)	x
LO	Describe the application and characteristics of: — RWY centre line markings — THR marking	x
010 09 04 03	Lights	
LO	Describe mechanical safety considerations regarding elevated approach lights and elevated RWY, stopway and taxiway-lights	x
LO	Discuss the relationship of the intensity of RWY lighting, the approach lighting system and the use of a separate intensity control for different lighting systems	x
LO	List the conditions for the installation of an AD beacon and describe its general characteristics	x
LO	Name the different kinds of operations for which a simple APP lighting system shall be used	x
LO	Describe the basic installations of a simple APP lighting system including the dimensions and distances normally used	x
LO	Describe the principle of a precision APP category I lighting system including such information as location and characteristics Remark — This includes the ‘Calvert’ system with additional crossbars	x
LO	Describe the wing bars of PAPI and APAPI	x
LO	Interpret what the pilot will see during approach, using PAPI, APAPI, T-VASIS and ATVASIS	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	Explain the application and characteristics of: — RWY edge lights — RWY threshold and wing bar lights — RWY end lights — RWY centre line lights — RWY lead in lights — RWY touchdown zone lights — Stopway lights — Taxiway centre line lights — Taxiway edge lights — Stop bars — Intermediate holding position lights — RWY guard lights — Road holding position lights	x
010 09 04 04	Signs	
LO	State the general purpose for installing signs	x
LO	Explain what signs are the only ones on the movement area utilising red	x
LO	List the provisions for illuminating signs	x
LO	State the purpose for installing mandatory instruction signs	x
LO	Name the kind of signs which mandatory instruction signs shall include	x
LO	Name the colours used with mandatory instruction signs	x
LO	Describe the location of: — a RWY designation sign at a taxiway/RWY intersection — a NO ENTRY sign — a RWY holding position sign	x
LO	Name the sign with which it shall be indicated that a taxiing aircraft is about to infringe an obstacle limitation surface or to interfere with the operation of radio navigation aids (e.g. ILS/MLS critical/sensitive area)	x
LO	Describe the various possible inscriptions on RWY designation signs and on holding position signs	x
LO	Describe the inscription on an Intermediate-holding position sign on a taxiway	x
010 09 08 00	Attachment A to ICAO Annex 14, Volume 1 — Supplementary Guidance Material	
010 09 08 03	Approach lighting systems	
LO	Name the two main groups of approach lighting systems	x
LO	Describe the two different versions of a simple approach lighting system	x
LO	Describe the two different basic versions of precision approach lighting systems for CAT I	x
LO	Describe how the arrangement of an approach lighting system and the location of the appropriate threshold are interrelated with each other	x

AMC3 FCL.615(b) IR Theoretical knowledge and flight instruction

Detailed theoretical knowledge syllabus and learning objectives

Subject Aircraft General Knowledge — Instrumentation (Competency-based modular training course (CB-IR(A)) for instrument rating according to Appendix 6 Aa and en-route instrument rating (EIR) course according to FCL.825)

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
022 00 00 00	**AIRCRAFT GENERAL KNOWLEDGE — INSTRUMENTATION**	
022 02 00 00	**MEASUREMENT OF AIR DATA PARAMETERS**	
022 02 01 00	Pressure measurement	
022 02 01 02	Pitot/static system: design and errors	
LO	Describe the design and the operating principle of a: — static source — Pitot tube — combined Pitot/static probe	x
LO	For each of these indicate the various locations, describe the following associated errors: — position errors — instrument errors -errors due to a non-longitudinal axial flow (including manoeuvre-induced errors), and the means of correction and/or compensation	x
LO	Explain the purpose of heating and interpret the effect of heating on sensed pressure	x
LO	List the affected instruments and explain the consequences for the pilot in case of a malfunction including blockage and leakage	x
LO	Describe alternate static sources and their effects when used	x
022 02 04 00	Altimeter	
LO	Define the following terms: -height, altitude, -indicated altitude, true altitude, -pressure altitude, density altitude	x
LO	Define the following barometric references: QNH, QFE, 1013,25 hPa	x
LO	Explain the operating principles of an altimeter	x
LO	Describe and compare the following three types of altimeters: — simple altimeter (single capsule) — sensitive altimeter (multi capsule) — servo-assisted altimeter	x
LO	Give examples of associated displays: pointer, multi pointer, drum, vertical straight scale	x
LO	Describe the following errors: — Pitot/static system errors — temperature error (air column not at ISA conditions) — time lag (altimeter response to change of height) and the means of correction	x
LO	Give examples of altimeter corrections table from an Aircraft Operations Manual (AOM)	x
LO	Describe the effects of a blockage or a leakage on the static pressure line	x
022 02 05 00	Vertical Speed Indicator (VSI)	
LO	Explain the operating principles of a VSI	x
LO	Describe and compare the following two types of vertical speed indicators: — barometric type — inertial type (inertial information provided by an Inertial Reference Unit)	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	Describe the following VSI errors: — Pitot/static system errors — time lag and the means of correction	x
LO	Describe the effects on a VSI of a blockage or a leakage on the static pressure line	x
022 02 06 00	Airspeed Indicator (ASI)	
LO	Define IAS, CAS, EAS, TAS and state and explain the relationship between these speeds	x
LO	Describe the following ASI errors and state when they must be considered: — Pitot/static system errors — compressibility error — density error	x
LO	Explain the operating principles of an ASI (as appropriate to aeroplanes or helicopters)	x
LO	Describe the effects on an ASI of a blockage or a leak in the static and/or total pressure line(s)	x
022 03 00 00	**MAGNETISM — DIRECT READING COMPASS AND FLUX VALVE**	
022 04 00 00	**GYROSCOPIC INSTRUMENTS**	
022 04 01 00	Gyroscope: basic principles	
LO	Define a gyro	x
LO	Explain the fundamentals of the theory of gyroscopic forces	x
LO	Define the degrees of freedom of a gyro Remark: As a convention, the degrees of freedom of a gyroscope do not include its own axis of rotation (the spin axis)	x
022 04 02 00	Rate of turn indicator /-Turn Co-ordinator — Balance (Slip) Indicator	
LO	Explain the purpose of a rate of turn and balance (slip) indicator	x
LO	Define a rate-one turn	x
LO	Explain the relation between bank angle, rate of turn and TAS	x
LO	Explain why the indication of a rate of turn indicator is only correct for one TAS and when turn is co- ordinated	x
LO	Explain the purpose of a balance (slip) indicator	x
LO	Describe the indications of a rate of turn and balance (slip) indicator during a balanced, slip or skid turn	x
LO	Describe the construction and principles of operation of a Turn Co-ordinator (or Turn and Bank Indicator)	x
LO	Compare the rate of turn indicator and the turn co-ordinator	x
022 04 03 00	Attitude Indicator (Artificial Horizon)	
LO	Explain the purpose of the attitude indicator	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	Describe the different designs and principles of operation of attitude indicators (air driven, electric)	x
LO	Describe the attitude display and instrument markings	x
022 04 04 00	Directional gyroscope	
LO	Explain the purpose of the directional gyroscope	x
LO	Describe the following two types of directional gyroscopes: — Air driven directional gyro — Electric directional gyro	x
022 04 06 00	Solid-State Systems — AHRS	
LO	Describe the basic principle of a solid-state Attitude and Heading Reference System (AHRS) using a solid state 3-axis rate sensor, 3-axis accelerometer and a 3-axis magnetometer	x
022 12 00 00	**ALERTING SYSTEMS, PROXIMITY SYSTEMS**	
022 13 00 00	**INTEGRATED INSTRUMENTS — ELECTRONIC DISPLAYS**	
022 13 01 00	Electronic display units	
022 13 01 01	Design, limitations	
LO	List the different technologies used e.g. CRT and LCD and the associated limitations: — cockpit temperature — glare	x
022 13 02 00	Mechanical Integrated instruments: ADI/HIS	
LO	Describe an Attitude and Director Indicator (ADI) and a Horizontal Situation Indicator (HSI)	x
LO	List all the information that can be displayed for either instruments	x
022 13 03 00	Electronic Flight Instrument Systems (EFIS)	
022 13 03 01	Design, operation	
LO	List and describe the different components of an EFIS	x
022 13 03 02	Primary Flight Display (PFD), Electronic Attitude Director Indicator (EADI)	
LO	State that a PFD (or an EADI) presents a dynamic colour display of all the parameters necessary to control the aircraft	x
LO	List and describe the following information that can be displayed on the Primary Flight Display (PFD) unit of an aircraft: — Flight Mode Annunciation — basic T: — attitude — IAS — altitude	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
	— heading/track indications — vertical speed — maximum airspeed warning — selected airspeed —speed trend vector— selected altitude — current barometric reference — steering indications (FD command bars) — selected heading — Flight Path Vector (FPV) — Radio altitude — Decision height — ILS indications — ACAS (TCAS) indications — failure flags and messages	
022 13 03 03	Navigation Display (ND), Electronic Horizontal Situation Indicator (EHSI)	
LO	State that a ND (or an EHSI) provides a mode-selectable colour flight navigation display	x

AMC4 FCL.615(b) IR Theoretical knowledge and flight instruction

Detailed theoretical knowledge syllabus and learning objectives

Subject Flight Planning and Flight Monitoring (Competency-based modular training course (CB-IR(A)) for instrument rating according to Appendix 6 Aa and en-route instrument (EIR) rating course according to FCL.825)

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR(A) and EIR
033 00 00 00	**FLIGHT PLANNING AND FLIGHT MONITORING**	
033 02 00 00	**FLIGHT PLANNING FOR IFR FLIGHTS**	
033 02 01 00	IFR Navigation plan	
033 02 01 01	Airways and routes	
LO	Select the preferred airway(s) or route(s) considering: — Altitudes and Flight levels — Standard routes — ATC restrictions — Shortest distance — Obstacles — Any other relevant data	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR(A) and EIR
033 02 01 02	Courses and distances from en-route charts	
LO	Determine courses and distances	x
LO	Determine bearings and distances of waypoints from radio navigation aids	x
033 02 01 03	Altitudes	
LO	Define the following altitudes: — Minimum En-route Altitude (MEA) — Minimum Obstacle Clearance Altitude (MOCA) — Minimum Off Route Altitude (MORA) — Grid Minimum Off-Route Altitude (Grid MORA) — Maximum Authorised Altitude (MAA) — Minimum Crossing Altitude (MCA) — Minimum Holding Altitude (MHA)	x
LO	Extract the following altitudes from the chart(s): — Minimum En-route Altitude (MEA) — Minimum Obstacle Clearance Altitude (MOCA) — Minimum Off Route Altitude (MORA) — Grid Minimum Off-Route Altitude (Grid MORA) — Maximum Authorised Altitude (MAA) — Minimum Crossing Altitude (MCA) — Minimum Holding Altitude (MHA)	x
033 02 01 04	Standard Instrument Departures (SIDs) and Standard Arrival Routes (STARs)	
LO	Explain the reasons for studying SID and STAR charts	x
LO	State the reasons why the SID and STAR charts show procedures only in a pictorial presentation style which is not to scale	x
LO	Interpret all data and information represented on SID and STAR charts, particularly: — Routings. — Distances — Courses — Radials — Altitudes/Levels — Frequencies — Restrictions	x
LO	Identify SIDs and STARs which might be relevant to a planned flight	x
033 02 01 05	Instrument Approach Charts	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR(A) and EIR
LO	State the reasons for being familiar with instrument approach procedures and appropriate data for departure, destination and alternate airfields	x
LO	Select instrument approach procedures appropriate for departure, destination and alternate airfields	x
LO	Interpret all procedures, data and information represented on Instrument Approach Charts, particularly: — Courses and Radials — Distances — Altitudes/Levels/Heights — Restrictions — Obstructions — Frequencies — Speeds and times — Decision Altitudes/Heights (DA/H) and Minimum Descent Altitudes/Heights (MDA/H) — Visibility and Runway Visual Ranges (RVR) — Approach light systems	x
033 02 01 06	Communications and Radio Navigation planning data	
LO	Find communication frequencies and call signs for the following: — Control agencies and service facilities — Flight information services (FIS) — Weather information stations — Automatic Terminal Information Service (ATIS)	x
LO	Find the frequency and/or identifiers of radio navigation aids	x
033 02 01 07	Completion of navigation plan	
LO	Complete the navigation plan with the courses, distances and frequencies taken from charts	x
LO	Find Standard Instrument Departure and Arrival Routes to be flown and/or to be expected	x
LO	Determine the position of Top of Climb (TOC) and Top of Descent (TOD) given appropriate data	x
LO	Determine variation and calculate magnetic/true courses	x
LO	Calculate True Air Speed (TAS) given aircraft performance data, altitude and Outside Air Temperature (OAT)	x
LO	Calculate Wind Correction Angles (WCA)/Drift and Ground Speeds (GS)	x
LO	Determine all relevant Altitudes/Levels particularly MEA, MOCA, MORA , MAA, MCA, MRA and MSA	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR(A) and EIR
LO	Calculate individual and accumulated times for each leg to destination and alternate airfields	x
033 03 00 00	**FUEL PLANNING**	
033 03 01 00	General	
LO	Convert between volume, mass and density given in different units which are commonly used in aviation	x
LO	Determine relevant data from flight manual, such as fuel capacity, fuel flow/consumption at different power/thrust settings, altitudes and atmospheric conditions	x
LO	Calculate attainable flight time/range given fuel flow/consumption and available amount of fuel	x
LO	Calculate the required fuel given fuel flow/consumption and required time/range to be flown	x
LO	Calculate the required fuel for an IFR flight given expected meteorological conditions and expected delays under defined conditions.	x
033 04 00 00	**PRE-FLIGHT PREPARATION**	
033 04 01 00	NOTAM briefing	
033 04 01 01	Ground facilities and services	
LO	Check that ground facilities and services required for the planned flight are available and adequate	x
033 04 01 02	Departure, destination and alternate aerodromes	
LO	Find and analyse the latest state at the departure, destination and alternate aerodromes, in particular for: — Opening hours — Work in Progress (WIP) — Special procedures due to Work in Progress (WIP) — Obstructions — Changes of frequencies for communications, navigation aids and facilities	x
033 04 01 03	Airway routings and airspace structure	
LO	Find and analyse the latest en-route state for: — Airway(s) or Route(s) — Restricted, Dangerous and Prohibited areas — Changes of frequencies for communications, navigation aids and facilities	x
033 04 02 00	Meteorological briefing	
033 04 02 02	Update of navigation plan using the latest meteorological information:	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR(A) and EIR
LO	Confirm the optimum altitude/FL given wind, temperature and aircraft data	x
LO	Confirm magnetic headings and ground speeds	x
LO	Confirm the individual leg times and the total time en route	x
LO	Confirm the total time en route for the trip to the destination	x
LO	Confirm the total time from destination to the alternate airfield	x
033 04 02 05	Update of fuel log	
LO	Calculate revised fuel data in accordance with changed conditions	x
033 05 00 00	**ICAO FLIGHT PLAN (ATS Flight Plan)**	
033 05 01 00	Individual Flight Plan	
033 05 01 01	Format of Flight Plan	
LO	State the reasons for a fixed format of an ICAO ATS Flight Plan (FPL)	x
LO	Determine the correct entries to complete an FPL plus decode and interpret the entries in a completed FPL, particularly for the following: — Aircraft identification (Item 7) — Flight rules and type of flight (Item 8) — Number and type of aircraft and wake turbulence category (Item 9) — Equipment (Item 10) — Departure aerodrome and time (Item 13) — Route (Item 15) — Destination aerodrome, total estimated elapsed time and Alternate aerodrome (Item 16) — Other information (Item 18) — Supplementary Information (Item 19)	x
033 05 01 02	Completion of an ATS Flight Plan (FPL)	
LO	Complete the Flight Plan using information from the following: — Navigation plan — Fuel plan — Operator’s records for basic aircraft information	x
033 05 03 00	Submission of an ATS Flight Plan (FPL)	
LO	Explain the requirements for the submission of an ATS Flight Plan	x
LO	Explain the actions to be taken in case of Flight Plan changes	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR(A) and EIR
LO	State the actions to be taken in case of inadvertent changes to Track, TAS and time estimate affecting the current Flight Plan	x
LO	Explain the procedures for closing a Flight Plan	x

AMC5 FCL.615(b) IR Theoretical knowledge and flight instruction

Detailed theoretical knowledge syllabus and learning objectives

Subject Human Performance (Competency-based modular training course (CB-IR(A)) for instrument rating according to Appendix 6 Aa and en route instrument rating (EIR) course according to FCL.825).

Syllabus Reference	Syllabus and Learning Objectives	CB-IR (A) and EIR
040 00 00 00	**HUMAN PERFORMANCE**	
040 01 00 00	**HUMAN FACTORS: BASIC CONCEPTS**	
040 01 03 00	Flight safety concepts	
LO	Explain the three components of the Threat and Error Management Model (TEM).	x
LO	Explain and give examples of latent threats	x
LO	Explain and give examples of Environmental Threats	x
LO	Explain and give examples of Organizational Threats	x
LO	Explain and give a definition of Error according the TEM-model in ICAO Annex 1	x
LO	Give examples of different countermeasures which may be used in order to manage Threats, Errors and Undesired Aircraft States	x
LO	Explain and give examples of Procedural Error	x
040 01 04 00	Safety culture	
LO	Distinguish between ‘open cultures’ and ‘closed cultures’	x
LO	Illustrate how Safety Culture is reflected by National Culture	x
LO	Explain James Reason’s Swiss Cheese Model	x
LO	State important factors that promote a good Safety Culture	x
LO	Distinguish between ‘Just Culture’ and ‘Non-punitive Culture’	x
LO	Name five components which form Safety Culture (According to James Reason)	x
040 02 00 00	**BASIC AVIATION PHYSIOLOGY AND HEALTH MAINTENANCE**	

Syllabus Reference	Syllabus and Learning Objectives	CB-IR (A) and EIR
040 02 01 00	Basics of flight physiology	
040 02 01 02	Respiratory and circulatory systems	
LO	Define 'linear', 'angular' and 'radial acceleration'	x
LO	Describe the effects of acceleration on the circulation and blood volume distribution	x
LO	List the factors determining the effects of acceleration on the human body	x
LO	Describe measures which may be taken to increase tolerance to positive acceleration	x
LO	List the effects of positive acceleration with respect to type, sequence and the corresponding G –load	x
040 02 02 00	Man and Environment: the sensory system	
LO	List the different senses	x
LO	State the multi-sensory nature of human perception	x
040 02 02 04	Equilibrium	
	Functional Anatomy	
LO	List the main elements of the vestibular apparatus	x
LO	State the functions of the vestibular apparatus on the ground and in flight	x
LO	Distinguish between the component parts of the vestibular apparatus in the detection of linear and angular acceleration as well as on gravity	x
LO	Explain how the semi-circular canals are stimulated	x
	Motion sickness	
LO	Describe air-sickness and its accompanying symptoms	x
LO	List the causes of motion sickness	x
LO	Describe the necessary actions to be taken to counteract the symptoms of motion sickness	x
040 02 02 05	Integration of sensory inputs	
LO	State the interaction between vision, equilibrium, proprioception and hearing to obtain spatial orientation in flight	x
LO	Define the term ‘illusion’	x
LO	Give examples of visual illusions based on shape constancy, size constancy, aerial perspective, atmospheric perspective, the absence of focal or ambient cues, autokinesis, vectional false horizons and surface planes	x

Syllabus Reference	Syllabus and Learning Objectives	CB-IR (A) and EIR
LO	Relate these illusions to problems that may be experienced in flight and identify the danger attached to them	x
LO	State the conditions which cause the 'black hole' effect and 'empty field myopia'	x
LO	Give examples of approach and landing illusions, state the danger involved and give recommendations to avoid or counteract these problems	x
LO	State the problems associated with flickering lights (strobe-lights, anti-collision lights, etc.)	x
LO	Give examples of vestibular illusions such as Somatogyral (the Leans), Coriolis, Somatogravic and g-effect illusions	x
LO	Relate the above mentioned vestibular illusions to problems encountered in flight and state the dangers involved	x
LO	List and describe the function of the proprioceptive senses ('Seat -of-the-Pants-Sense')	x
LO	Relate illusions of the proprioceptive senses to the problems encountered during flight	x
LO	State that the 'Seat-of-the-Pants-Sense' is completely unreliable when visual contact with the ground is lost or when flying in IMC or poor visual horizon	x
LO	Differentiate between Vertigo, Coriolis effect and spatial disorientation	x
LO	Explain The Flicker Effect (Stroboscopic Effect) and discuss counter measures	x
LO	Explain how spatial disorientation can result from a mismatch in sensory input and information processing	x
LO	List the measures to prevent and/or overcome spatial disorientation	x
040 03 00 00	**BASIC AVIATION PSYCHOLOGY**	
040 03 02 00	Human error and reliability	
040 03 02 02	Mental models and situation awareness	
LO	Define the term 'situation awareness'	x
LO	List cues which indicate the loss of situation awareness and name the steps to regain it	x
LO	List factors which influence one's Situation Awareness both positively and negatively and stress the importance of Situation Awareness in the context of flight safety	x
LO	Define the term 'mental model' in relation to a surrounding complex situation	x
LO	Describe the advantage/disadvantage of mental models	x

Syllabus Reference	Syllabus and Learning Objectives	CB-IR (A) and EIR
LO	Explain the relationship between personal ‘mental models’ and the creation of cognitive illusions	x
040 03 02 03	Theory and model of human error	
LO	Define the term ‘error’	x
LO	Explain the concept of the ‘error chain’	x
LO	Differentiate between an isolated error and an error chain	x
LO	Distinguish between the main forms/types of errors (i.e. slips, faults, omissions and violations)	x
LO	Discuss the above errors and their relevance in-flight	x
LO	Distinguish between an active and a latent error and give examples	x
040 03 02 04	Error generation	
LO	Distinguish between internal and external factors in error generation	x
LO	Identify possible sources of internal error generation	x
LO	Define and discuss the two errors associated with motor programmes	x
LO	List the three main sources for external error generation in the cockpit	x
LO	Give examples to illustrate the following factors in external error generation in the cockpit: — Ergonomics — Economics — Social environment	x
LO	Name major goals in the design of human centred man-machine interfaces	x
LO	Define the term 'error tolerance'	x
LO	List (and describe) strategies which are used to reduce human error	x
040 03 03 00	Decision making	
040 03 03 01	Decision-making concepts	
LO	Define the term ‘deciding’ and ‘decision-making’	x
LO	Describe the major factors on which a decision-making should be based during the course of a flight	x
LO	Describe the main human attributes with regard to decision making	x
LO	Discuss the nature of bias and its influence on the decision making process	x

Syllabus Reference	Syllabus and Learning Objectives	CB-IR (A) and EIR
LO	Describe the main error sources and limits in an individual's decision making mechanism	x
LO	State the factors upon which an individual's risk assessment is based	x
LO	Explain the relationship between risk assessment, commitment, and pressure of time on decision making strategies	x
LO	Describe the positive and negative influences exerted by other group members on an individual's decision making process	x
LO	Explain the general idea behind the creation of a model for decision making based upon: — definition of the aim — collection of information — risk assessment — development of options — evaluation of options — decision — implementation — consequences — review and feedback	x
040 03 04 00	Avoiding and managing errors: cockpit management	
040 03 04 01	Safety awareness	
LO	Justify the need for being aware of not only one's own performance but that of others before and during a flight and the possible consequences and/or risks	x
LO	Stress the overall importance of constantly and positively striving to monitor for errors and thereby maintaining situation awareness	x
040 03 06 00	Human overload and underload	
040 03 06 02	Stress	
LO	Explain the biological reaction to stress by means of the general adaptation syndrome (GAS)	x
LO	Name the 3 phases of the GAS	x
LO	Name the symptoms of stress relating to the different phases of the GAS	x
LO	Explain how stress is cumulative and how stress from one situation can be transferred to a different situation	x
LO	Explain how successful completion of a stressful task will reduce the amount of stress experienced when a similar situation arises in the future	x
LO	Describe the effect of human under/overload on effectiveness in the cockpit	x

Syllabus Reference	Syllabus and Learning Objectives	CB-IR (A) and EIR
LO	List sources and symptoms of human underload	x
040 03 07 00	Advanced cockpit automation	
040 03 07 01	Advantages and disadvantages	
LO	Define and explain the basic concept of automation	x
LO	List the advantages/disadvantages of automation in the cockpit in respect of level of vigilance, attention, workload, situation awareness and crew coordination	x
LO	State the advantages and disadvantages of the two components of the man - machine system with regard to information input and processing, decision making, and output activities	
LO	Explain the 'ironies of automation'	x
LO	Give examples of methods to overcome the disadvantages of automation	x
040 03 07 02	Automation complacency	
LO	State the main weaknesses in the monitoring of automatic systems	x
LO	Explain the following terms in connection with automatic systems: — Passive monitoring — Blinkered concentration — Confusion — Mode awareness	x
LO	Give examples of actions which may be taken to counteract ineffective monitoring of automatic systems	x
LO	Define 'complacency'	x
040 03 07 03	Working concepts	
LO	Summarise how the negative effects of automation on pilots may be alleviated	x
LO	Interpret the role of automation with respect to flight safety	x

AMC6 FCL.615(b) IR Theoretical knowledge and flight instruction

Detailed theoretical knowledge syllabus and learning objectives

Subject Meteorology (Competency-based modular training course (CB-IR(A)) for instrument rating according to Appendix 6 Aa and en-route instrument rating (EIR) course according to FCL.825).

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
050 00 00 00	**METEOROLOGY**	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
050 01 00 00	**THE ATMOSPHERE**	
050 01 02 00	Air temperature	
050 01 02 04	Lapse rates	
LO	Describe qualitatively and quantitatively the temperature lapse rates of the troposphere (mean value 0.65°C/100 m or 2°C/1000 ft and actual values)	x
050 01 02 05	Development of inversions, types of inversions	
LO	Describe development and types of inversions	x
LO	Explain the characteristics of inversions and of an isothermal layer	x
LO	Explain the reasons for the formation of the following inversions: — ground inversion (nocturnal radiation/advection), subsidence inversion, frontal inversion, inversion above friction layer, valley inversion — tropopause inversion	x
050 01 02 06	Temperature near the earth's surface, surface effects, diurnal and seasonal variation, effect of clouds, effect of wind	
LO	Describe how the temperature near the earth's surface is influenced by seasonal variations	x
LO	Explain the cooling and warming of the air on the earth or sea surfaces	x
LO	Sketch the diurnal variation of the temperature of the air in relation to the radiation of the sun and of the earth	x
LO	Describe qualitatively the influence of the clouds on the cooling and warming of the surface and the air near the surface	x
LO	Distinguish between the influence of low or high clouds, thick or thin clouds	x
LO	Explain the influence of the wind on the cooling and warming of the air near the surfaces	x
050 01 03 00	Atmospheric pressure	
050 01 03 01	Barometric pressure, isobars	
LO	Define atmospheric pressure	x
LO	List the units of measurement of the atmospheric pressure used in aviation (hPa, inches) (Refer to 050 10 01 01)	x
LO	Describe isobars on the surface weather charts	x
LO	Define high, low, trough, ridge, wedge, col	x
050 01 03 02	Pressure variation with height, contours (isohypses)	
LO	Explain the pressure variation with height	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Describe qualitatively the variation of the barometric lapse rate Note: The average value for the barometric lapse rate near mean sea level is 27 ft (8 m) per 1 hPa, at about 5500 m/AMSL is 50 ft (15 m) per 1 hPa	x
LO	Describe and interpret contour lines (isohypses) on a constant pressure chart (Refer to 050 10 02 03)	x
050 01 03 03	Reduction of pressure to mean sea level, QFF	
LO	Define QFF	x
LO	Explain the reduction of measured pressure to mean sea level, QFF	x
LO	Mention the use of QFF for surface weather charts	x
050 01 03 04	Relationship between surface pressure centres and pressure centres aloft	
LO	Illustrate with a vertical cross section of isobaric surfaces the relationship between surface pressure systems and upper air pressure systems	x
050 01 04 00	Air density	
050 01 04 01	Relationship between pressure, temperature and density	
LO	Describe the relationship between pressure, temperature and density	x
LO	Describe the vertical variation of the air density in the atmosphere	x
LO	Describe the effect of humidity changes on the density of air	x
050 01 05 00	ICAO Standard Atmosphere (ISA)	
050 01 05 01	ICAO Standard Atmosphere	
LO	Explain the use of standardised values for the atmosphere	x
LO	List the main values of the ISA (mean sea level pressure, mean sea level temperature, the vertical temperature lapse rate up to 20 km, height and temperature of the tropopause)	x
LO	Calculate the standard temperature in degree Celsius for a given flight level	x
LO	Determine a standard temperature deviation by the difference between the given outside air temperature and the standard temperature	x
050 01 06 00	Altimetry	
050 01 06 01	Terminology and definitions	
LO	Define the following terms and abbreviations and explain how they are related to each other: height, altitude, pressure altitude, flight level, level, true altitude, true height, elevation, QNH, QFE and standard altimeter setting	x
LO	Describe the terms transition altitude, transition level, transition layer, terrain clearance, lowest usable x flight level	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
050 01 06 03	Calculations	
LO	Calculate the different readings on the altimeter when the pilot changes the altimeter setting	x
LO	Illustrate with a numbered example the changes of altimeter setting and the associated changes in reading when the pilot climbs through the transition altitude or descends through the transition level	x
LO	Derive the reading of the altimeter of an aircraft on the ground when the pilot uses the different settings	x
LO	Explain the influence of the air temperature on the distance between the ground and the level read on the altimeter and between two flight levels	x
LO	Explain the influence of pressure areas on the true altitude	x
LO	Determine the true altitude/height for a given altitude/height and a given ISA temperature deviation	x
LO	Calculate the terrain clearance and the lowest usable flight level for given atmospheric temperature and pressure conditions	x
LO	Note: The following rules shall be considered for altimetry calculations: a. All calculations are based on rounded pressure values to the nearest lower hPa b. The value for the barometric lapse rate near mean sea level is 27 ft (8 m) per 1 hPa c. To determine the true altitude/height the following rule of thumb, called the ‘ 4 %-rule’, shall be used: the altitude/height changes by 4 % for each 10°C temperature deviation from ISA d. If no further information is given, the deviation of outside air temperature from ISA is considered to be constantly the same given value in the whole layer e. The elevation of the airport has to be taken into account. The temperature correction has to be considered for the layer between ground and the position of the aircraft	x
050 01 06 04	Effect of accelerated airflow due to topography	
LO	Describe qualitatively how the effect of accelerated airflow due to topography (Bernoulli effect) affects x altimetry	x
050 02 00 00	**WIND**	
050 02 02 00	Primary cause of wind	
050 02 02 02	Variation of wind in the friction layer	
LO	Describe why and how the wind changes direction and speed with height in the friction layer in the northern and in the southern hemisphere (rule of thumb)	x
LO	Explain the relationship between isobars and wind (direction and speed)	x
	Note: Approximate value for variation of wind in the friction layer (values to be used in examinations)	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
	Type of landscape / Wind speed in friction layer in % of the geostrophic wind / The wind in the friction layer blows across the isobars towards the low pressure. Angle between wind direction and isobars over water / ca 70 % / ca 10° over land / ca 50 % / ca 30° WMO-NO. 266	
050 02 02 03	Effects of convergence and divergence	
LO	Describe atmospheric convergence and divergence	x
LO	Explain the effect of convergence and divergence on the following: pressure systems at the surface and aloft; wind speed; vertical motion and cloud formation (relationship between upper air conditions and surface pressure systems)	x
050 02 04 00	Local winds	
050 02 04 01	Anabatic and katabatic winds, mountain and valley winds, venturi effects, land and sea breezes	
LO	Describe and explain anabatic and katabatic winds	x
LO	Describe and explain mountain and valley winds	x
LO	Describe and explain the venturi effect, convergence in valleys and mountain areas	x
LO	Describe and explain land and sea breezes, sea breeze front	x
050 02 05 00	Mountain waves (standing waves, lee waves)	
050 02 05 01	Origin and characteristics	
LO	Describe and explain the origin and formation of mountain waves	x
LO	State the conditions necessary for the formation of mountain waves	x
LO	Describe the structure and properties of mountain waves	x
LO	Explain how mountain waves may be identified by their associated meteorological phenomena	x
050 02 06 00	Turbulence	
050 02 06 01	Description and types of turbulence	
LO	Describe turbulence and gustiness	x
LO	List common types of turbulence (convective, mechanical, orographic, frontal, clear air turbulence)	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
050 02 06 02	Formation and location of turbulence	
LO	Explain the formation of convective turbulence, mechanical and orographic turbulence, frontal turbulence, clear air turbulence (Refer to 050 02 06 03)	x
LO	State where turbulence will normally be found (rough ground surfaces, relief, inversion layers, CB, TS zones, unstable layers)	x
050 03 00 00	**THERMODYNAMICS**	
050 03 01 00	Humidity	
050 03 01 01	Water vapour in the atmosphere	
LO	Describe humid air	x
LO	Describe the significance of water vapour in the atmosphere for meteorology	x
LO	Indicate the sources of atmospheric humidity	x
050 03 01 03	Temperature/dew point, relative humidity	
LO	Define dew point	x
LO	Recognise the dew point curve on a simplified diagram (T,P)	x
LO	Define relative humidity	x
LO	Explain the factors influencing the relative humidity at constant pressure	x
LO	Explain the diurnal variation of the relative humidity	x
LO	Describe the relationship between relative humidity, the amount of water vapour and the temperature	x
LO	Describe the relationship between temperature and dew poi nt	x
LO	Estimate the relative humidity of the air from the difference between dew point and temperature	x
050 04 00 00	**CLOUDS AND FOG**	
050 04 01 00	Cloud formation and description	
050 04 01 01	Cloud formation	
LO	Explain cloud formation by adiabatic cooling, conduction, advection and radiation	x
LO	Describe the cloud formation based on the following lifting processes: unorganised lifting in thin layers and turbulent mixing; forced lifting at fronts or over mountains; free convection	x
LO	Determine the cloud base and top in a simplified diagram (temperature, pressure, humidity)	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Explain the influence of relative humidity on the height of the cloud base	x
LO	Illustrate in a thermodynamic diagram the meaning of convective temperature (temperature at which formation of cumulus starts)	x
LO	List cloud types typical for stable and unstable air conditions	x
LO	Summarise the conditions for the dissipation of clouds	x
050 04 01 02	Cloud types and cloud classification	
LO	Describe cloud types and cloud classification	X
LO	Identify by shape cirriform, cumuliform and stratiform clouds	X
LO	Identify by shape and typical level the ten cloud types (genera)	X
LO	Describe and identify by shape the following species and supplementary feature: castellanus, l enticularis, fractus, humilis, mediocris, congestus, calvus, capillatus and virga	X
LO	Distinguish between low, medium and high level clouds according to the WMO cloud étage (including heights) — for mid-latitudes — for all latitudes	X
LO	Distinguish between ice clouds, mixed clouds and pure water clouds	X
050 04 01 03	Influence of inversions on cloud development	
LO	Explain the influence of inversions on vertical movements in the atmosphere	x
LO	Explain the influence of an inversion on the formation of stratus clouds	x
LO	Explain the influence of ground inversion on the formation of fog	x
LO	Determine the top of a cumulus cloud caused by an inversion on a simplified diagram	x
050 04 01 04	Flying conditions in each cloud type	
LO	Assess the ten cloud types for icing and turbulence	x
050 04 02 00	Fog, mist, haze	
050 04 02 01	General aspects	
LO	Define fog, mist and haze with reference to WMO standards of visibility range	x
LO	Explain the formation of fog, mist and haze in general	x
LO	Name the factors contributing in general to the formation of fog and mist	x
LO	Name the factors contributing to the formation of haze	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Describe freezing fog and ice fog	x
050 04 02 02	Radiation fog	
LO	Explain the formation of radiation fog	x
LO	Explain the conditions for the development of radiation fog	x
LO	Describe the significant characteristics of radiation fog, and its vertical extent	x
LO	Summarise the conditions for the dissipation of radiation fog	x
050 04 02 03	Advection fog	
LO	Explain the formation of advection fog	x
LO	Explain the conditions for the development of advection fog	x
LO	Describe the different possibilities of advection fog formation (over land, sea and coastal regions)	x
LO	Describe significant characteristics of advection fog	x
LO	Summarise the conditions for the dissipation of advection fog	x
050 04 02 04	Steam fog	
LO	Explain the formation of steam fog	x
LO	Explain the conditions for the development of steam fog	x
LO	Describe significant characteristics of steam fog	x
LO	Summarise the conditions for the dissipation of steam fog	x
050 04 02 05	Frontal fog	
LO	Explain the formation of frontal fog	x
LO	Explain the conditions for the development of frontal fog	x
LO	Describe significant characteristics of frontal fog	x
LO	Summarise the conditions for the dissipation of frontal fog	x
050 04 02 06	Orographic fog (hill fog)	
LO	Summarise the features of orographic fog	x
LO	Explain the conditions for the development of orographic fog	x
LO	Describe significant characteristics of orographic fog	x
LO	Summarise the conditions for the dissipation of orographic fog	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
050 05 00 00	**PRECIPITATION**	
050 05 01 00	Development of precipitation	
050 05 01 01	Process of development of precipitation	
LO	Distinguish between the two following processes by which precipitation is formed	x
LO	Summarise the outlines of the ice crystal process (Bergeron-Findeisen)	x
LO	Summarise the outlines of the coalescence process	x
LO	Describe the atmospheric conditions that favour either process	x
LO	Explain the development of snow, rain, drizzle and hail	x
050 05 02 00	Types of precipitation	
050 05 02 01	Types of precipitation, relationship with cloud types	
LO	List and describe the types of precipitation given in the TAF and METAR codes (drizzle, rain, snow, snow grains, ice pellets, hail, small hail, snow pellets, ice crystals, freezing drizzle, freezing rain)	x
LO	State ICAO/WMO approximate diameters for cloud, drizzle and rain drops	x
LO	State approximate weights and diameters for hailstones	x
LO	Explain the mechanism for the formation of freezing precipitation	x
LO	Describe the weather conditions that give rise to freezing precipitation	x
LO	Distinguish between the types of precipitation generated in convective and stratiform cloud	x
LO	Assign typical precipitation types and intensities to different clouds	x
050 06 00 00	**AIR MASSES AND FRONTS**	
050 06 01 00	Air masses	
050 06 01 01	Description, classification and source regions of air masses	
LO	Define the term air mass	x
LO	Describe the properties of the source regions	x
LO	Summarise the classification of air masses by source regions	x
LO	State the classifications of air masses by temperature and humidity at source	x
LO	State the characteristic weather in each of the air masses	x
LO	Name the three main air masses that affect Europe	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Classify air masses on a surface weather chart	x
	Note: Names and abbreviations of air masses used in examinations: — first letter: humidity continental (c), maritime (m) — second letter: type of air mass Arctic (A), Polar (P), Tropical (T), Equatorial (E) — third letter: temperature cold (c), warm (w)	
050 06 01 02	Modifications of air masses	
LO	List the environmental factors that affect the final properties of an air mass	x
LO	Explain how maritime and continental tracks modify air masses	x
LO	Explain the effect of passage over cold or warm surfaces	x
LO	Explain how air mass weather is affected by the season, the air mass track and by orographic and thermal effects over land	x
LO	Assess the tendencies of the stability for an air mass and describe the typical resulting air mass weather including the hazards for aviation	x
050 06 02 00	Fronts	
050 06 02 01	General aspects	
LO	Describe the boundaries between air masses (fronts)	x
LO	Define front and frontal surface (frontal zone)	x
050 06 02 02	Warm front, associated clouds and weather	
LO	Define a warm front	x
LO	Describe the cloud, weather, ground visibility and aviation hazards at a warm front depending on the stability of the warm air	x
LO	Explain the seasonal differences in the weather at warm fronts	x
LO	Describe the structure, slope and dimensions of a warm front	x
LO	Sketch a cross-section of a warm front, showing weather, cloud and aviation hazards	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
050 06 02 03	Cold front, associated clouds and weather	
LO	Define a cold front	x
LO	Describe the cloud, weather, ground visibility and aviation hazards at a cold front depending on the stability of the warm air	x
LO	Explain the seasonal differences in the weather at cold fronts	x
LO	Describe the structure, slope and dimensions of a cold front	x
LO	Sketch a cross-section of a cold front, showing weather, cloud and aviation hazards	x
050 06 02 04	Warm sector, associated clouds and weather	
LO	Define fronts and air masses associated with the warm sector	x
LO	Describe the cloud, weather, ground visibility and aviation hazards in a warm sector	x
LO	Explain the seasonal differences in the weather in the warm sector	x
LO	Sketch a cross-section of a warm sector, showing weather, cloud and aviation hazards	x
050 06 02 05	Weather behind the cold front	
LO	Describe the cloud, weather, ground visibility and aviation hazards behind the cold front	x
LO	Explain the seasonal differences in the weather behind the cold front	x
050 06 02 06	Occlusions, associated clouds and weather	
LO	Define the term occlusion	x
LO	Define a cold occlusion	x
LO	Define a warm occlusion	x
LO	Describe the cloud, weather, ground visibility and aviation hazard s in a cold occlusion	x
LO	Describe the cloud, weather, ground visibility and aviation hazards in a warm occlusion	x
LO	Explain the seasonal differences in the weather at occlusions	x
LO	Sketch a cross-section of cold and warm occlusions, showing weather, cloud and aviation hazards	x
LO	In a sketch plan illustrate the development of an occlusion and the movement of the occlusion point	x
050 06 02 07	Stationary front, associated clouds and weather	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Define a stationary or quasi-stationary front	x
LO	Describe the cloud, weather, ground visibility and aviation hazards in a stationary or quasi -stationary front	x
050 06 02 08	Movement of fronts and pressure systems, life cycle	
LO	Describe the movements of fronts and pressure systems and the life cycle of a mid-latitude depression	x
LO	State the rules for predicting the direction and the speed of movement of fronts	x
LO	Explain the difference between the speed of movement of cold and warm fronts	x
LO	State the rules for predicting the direction and the speed of movement of frontal depressions	x
LO	Describe, with a sketch if required, the genesis, development and life cycle of a frontal depression with associated cloud and rain belts	x
050 06 02 09	Changes of meteorological elements at a frontal wave	
LO	Sketch a plan and a cross-section of a frontal wave (warm front, warm sector and cold front) and illustrate the changes of pressure, temperature, surface wind and wind in the vertical axis	x
050 07 00 00	**PRESSURE SYSTEMS**	
050 07 02 00	Anticyclone	
050 07 02 01	Anticyclones, types, general properties, cold and warm anticyclones, ridges and wedges, subsidence	
LO	List the different types of anticyclones	x
LO	Describe the effect of high level convergence in producing areas of high pressure at ground level	x
LO	Describe air mass subsidence, its effect on the environmental lapse rate, and the associated weather	x
LO	Describe the formation of warm and cold anticyclones	x
LO	Describe the formation of ridges and wedges (Refer to 050 08 03 02)	x
LO	Describe the properties of and the weather associated with warm and cold anticyclones	x
LO	Describe the properties of and the weather associated with ridges and wedges	x
LO	Describe the blocking anticyclone and its effects	x
050 07 03 00	Non frontal depressions	
050 07 03 01	Thermal-, orographic-, polar- and secondary depressions, troughs	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Describe the effect of high level divergence in producing areas of low pressure at ground level	x
LO	Describe the formation and properties of thermal-, orographic- (lee lows), polar- and secondary depressions	x
LO	Describe the formation, the properties and the associated weather of troughs	x
050 08 00 00	**CLIMATOLOGY**	
050 08 03 00	Typical weather situations in the mid-latitudes	
050 08 03 01	Westerly situation (westerlies)	
LO	Identify on a weather chart the typical westerly situation with travelling polar front waves	x
LO	Describe the typical weather in the region of the travelling polar front waves including the seasonal variations	x
050 08 03 02	High pressure area	
LO	Describe the high pressure zones with the associated weather	x
LO	Identify on a weather chart high pressure regions	x
LO	Describe the weather associated with wedges in the polar air (Refer to 050 07 02 01)	x
050 08 03 03	Flat pressure pattern	
LO	Identify on a surface weather chart the typical flat pressure pattern	x
LO	Describe the weather associated with a flat pressure pattern	x
050 09 00 00	**FLIGHT HAZARDS**	
050 09 01 00	Icing	
050 09 01 01	Conditions for ice accretion	
LO	Summarise the general conditions under which ice accretion occurs on aircraft (temperatures of outside air; temperature of the airframe; presence of supercooled water in clouds, fog, rain and drizzle; possibility of sublimation)	x
LO	Indicate the general weather conditions under which ice accretion in venturi carburettor occurs	x
LO	Explain the general weather conditions under which ice accretion on airframe occurs	x
LO	Explain the formation of supercooled water in clouds, rain and drizzle (Refer to 050 03 02 01)	x
LO	Explain qualitatively the relationship between the air temperature and the amount of supercooled water	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Explain qualitatively the relationship between the type of cloud and the size and number of the droplets, in cumuliform and stratiform clouds	x
LO	Indicate in which circumstances ice can form on an aircraft on the ground: air temperature, humidity, precipitation	x
LO	Explain in which circumstances ice can form on an aircraft in flight: inside clouds, in precipitation, outside clouds and precipitation	x
LO	Describe the different factors influencing the intensity of icing: air temperature, amount of supercooled water in a cloud or in precipitation, amount of ice crystals in the air, speed of the aircraft, shape (thickness) of the airframe parts (wings, antennas, etc)	x
LO	Explain the effects of topography on icing	x
LO	Explain the higher concentration of water drops in stratiform orographic clouds	x
050 09 01 02	Types of ice accretion	
LO	Define clear ice	x
LO	Describe the conditions for the formation of clear ice	x
LO	Explain the formation of the structure of clear ice with the release of latent heat during the freezing process	x
LO	Describe the aspect of clear ice: appearance, weight, solidity	x
LO	Define rime ice	x
LO	Describe the conditions for the formation of rime ice	x
LO	Describe the aspect of rime ice: appearance, weight, solidity	x
LO	Define mixed ice	x
LO	Describe the conditions for the formation of mixed ice	x
LO	Describe the aspect of mixed ice: appearance, weight, solidity	x
LO	Describe the possible process of ice formation in snow conditions	x
LO	Define hoar frost	x
LO	Describe the conditions for the formation of hoar frost	x
LO	Describe the aspect of hoar frost: appearance, solidity	x
050 09 01 03	Hazards of ice accretion, avoidance	
LO	State the ICAO qualifying terms for the intensity of icing (See ICAO ATM Doc 4444)	x
LO	Describe, in general, the hazards of icing	x
LO	Assess the dangers of the different types of ice accretion	x
LO	Describe the position of the dangerous zones of icing in fronts, in stratiform and cumuliform clouds and in the different precipitation types	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Indicate the possibilities of avoidance — in the flight planning: weather briefing, choice of track and altitude — during flight: recognition of the dangerous zones, choice of appropriate track and altitude	x
050 09 02 00	Turbulence	
050 09 02 01	Effects on flight, avoidance	
LO	State the ICAO qualifying terms for the intensity of turbulence (See ICAO ATM Doc 4444)	x
LO	Describe the effects of turbulence on an aircraft in flight	x
LO	Indicate the possibilities of avoidance — in the flight planning: weather briefing, choice of track and altitude — during flight: choice of appropriate track and altitude	x
050 09 03 00	Wind shear	
050 09 03 01	Definition of wind shear	
LO	Define wind shear (vertical and horizontal)	x
LO	Define low level wind shear	x
050 09 03 02	Weather conditions for wind shear	
LO	Describe conditions where and how wind shear can form (e.g. thunderstorms, squall lines, fronts, inversions, land and sea breeze, friction layer, relief)	x
050 09 03 03	Effects on flight, avoidance	
LO	Describe the effects on flight caused by wind shear	x
LO	Indicate the possibilities of avoidance — in the flight planning — during flight	x
050 09 04 00	Thunderstorms	
050 09 04 01	Conditions for and process of development, forecast, location, type specification	
LO	Name the cloud types which indicate the development of thunderstorms	x
LO	Describe the different types of thunderstorms, their location, the conditions for and the process of development and list their properties (air mass thunderstorms, frontal thunderstorms, squall lines, supercell storms, orographic thunderstorms)	x
050 09 04 02	Structure of thunderstorms, life history	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Describe and sketch the stages of the life history of a thunderstorm: initial, mature and dissipating stage	x
LO	Assess the average duration of thunderstorms and their different stages	x
LO	Describe supercell storm: initial, supercell, tornado an d dissipating stage	x
LO	Summarise the flight hazards of a fully developed thunderstorm	x
LO	Indicate on a sketch the most dangerous zones in and around a thunderstorm	x
050 09 04 03	Electrical discharges	
LO	Describe the basic outline of the electric field in the atmosphere	x
LO	Describe the electrical potential differences in and around a thunderstorm	x
LO	Describe and asses ‘St. Elmo’s fire’	x
LO	Describe the development of lightning discharges	x
LO	Describe the effect of lightning strike on aircraft and flight execution	x
050 09 04 04	Development and effects of downbursts	
LO	Define the term downburst	x
LO	Distinguish between macroburst and microburst	x
LO	State the weather situations leading to the formation of downbursts	x
LO	Describe the process of development of a downburst	x
LO	Give the typical duration of a downburst	x
LO	Describe the effects of downbursts	x
050 09 04 05	Thunderstorm avoidance	
LO	Explain how the pilot can anticipate each type of thunderstorms: pre-flight weather briefing, observation in flight, use of specific meteorological information, use of information given by ground weather radar and by airborne weather radar (Refer to 050 10 01 04), use of the stormscope (lightning detector)	x
LO	Describe practical examples of flight techniques used to avoid the hazards of thunderstorms	x
050 09 05 00	Tornadoes	
050 09 05 01	Properties and occurrence	
LO	Define the tornado	x
050 09 06 00	Inversions	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
050 09 06 01	Influence on aircraft performance	
LO	Explain the influence of inversions on the aircraft performance	x
LO	Compare the flight hazards during take-off and approach associated to a strong inversion alone and to a strong inversion combined with marked wind shear	x
050 09 08 00	Hazards in mountainous areas	
050 09 08 01	Influence of terrain on clouds and precipitation, frontal passage	
LO	Describe the influence of a mountainous terrain on cloud and precipitation	x
LO	Describe the effects of the Foehn	x
LO	Describe the influence of a mountainous area on a frontal passage	x
050 09 08 02	Vertical movements, mountain waves, wind shear, turbulence, ice accretion	
LO	Describe the vertical movements, wind shear and turbulence typical of mountain areas	x
LO	Indicate in a sketch of a chain of mountains the turbulent zones (mountain waves, rotors)	x
LO	Explain the influence of relief on ice accretion	x
050 09 08 03	Development and effect of valley inversions	
LO	Describe the formation of valley inversion due to the katabatic winds	x
LO	Describe the valley inversion formed by warm winds aloft	x
LO	Describe the effects of a valley inversion for an aircraft in flight	x
050 09 09 00	Visibility reducing phenomena	
050 09 09 01	Reduction of visibility caused by precipitation and obscurations	
LO	Describe the reduction of visibility caused by precipitation: drizzle, rain, snow	x
LO	Describe the reduction of visibility caused by obscurations: — fog, mist, haze, smoke, volcanic ash — sand (SA), dust (DU)	x
LO	Describe the differences between the ground visibility, flight visibility, slant visibility and vertical visibility when an aircraft is above or within a layer of haze or fog	x
050 09 09 02	Reduction of visibility caused by other phenomena	
LO	Describe the reduction of visibility caused by	x
	— low drifting and blowing snow — low drifting and blowing dust and sand	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
	— dust storm (DS) and sandstorm (SS) — icing (windshield) — the position of the sun relative to the visual direction — the reflection of sun's rays from the top of layers of haze, fog and clouds	
050 10 00 00	**METEOROLOGICAL INFORMATION**	
050 10 01 00	Observation	
050 10 01 01	Surface observations	
LO	Define visibility	x
LO	Describe the meteorological measurement of visibility	x
LO	Define prevailing visibility	x
LO	Define ground visibility	x
LO	List the units used for visibility (m, km)	x
LO	Define runway visual range	x
LO	Describe the meteorological measurement of runway visual range	x
LO	Indicate where the transmissometers/forward-scatter meters are placed on the airport	x
LO	List the units used for runway visual range (m)	x
LO	List the different possibilities to transmit information about runway visual range to pilots	x
LO	Compare visibility and runway visual range	x
LO	List the clouds considered in meteorological reports, and how they are indicated in METARs (TCU, CB)	x
LO	Define oktas	x
LO	Define cloud base	x
LO	Define ceiling	x
LO	Name the unit and the reference level used for information about cloud base (ft)	x
LO	Define vertical visibility	x
LO	Explain briefly how and when the vertical visibility is measured	x
LO	Name the unit used for vertical visibility (ft)	x
050 10 01 04	Weather radar observations	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Interpret ground weather radar images	x
LO	Describe the basic principle and the type of information given by airborne weather radar	x
LO	Describe the limits and the errors of airborne weather radar information	x
LO	Interpret typical airborne weather radar images	x
050 10 02 00	Weather charts	
050 10 02 01	Significant weather charts	
LO	Decode and interpret significant weather charts (low, medium and high level)	x
LO	Describe from a significant weather chart the flight conditions at designated locations and/or along a defined flight route at a given flight level	x
050 10 02 02	Surface charts	
LO	Recognize the following weather systems on a surface weather chart (analysed and forecast): ridges, cols and troughs; fronts; frontal side, warm sector and rear side of mid -latitude frontal lows; high and low pressure areas	x
050 10 03 00	Information for flight planning	
050 10 03 01	Aviation weather messages	
LO	Describe, decode and interpret the following aviation weather messages (given in written and/or graphical format): METAR, SPECI, TREND, TAF, SIGMET, AIRMET, GAMET, special air -report, volcanic ash advisory information	x
LO	Describe the general meaning of MET REPORT and SPECIAL	x
LO	List, in general, the cases when a SIGMET and an AIRMET are issued	x
LO	Describe, decode (by using a code table) and interpret the following messages: Runway State Message (as written in a METAR), GAFOR	x
LO	Note: For Runway State Message and GAFOR refer to Air Navigation Plan European Region ICAO Doc 7754	x
050 10 03 02	Meteorological broadcasts for aviation	
LO	Describe the meteorological content of broadcasts for aviation: — VOLMET, ATIS — HF-VOLMET	x
050 10 03 03	Use of meteorological documents	
LO	Describe meteorological briefing and advice	x
LO	List the information that a flight crew can receive from meteorological services for pre -flight planning and apply the content of these information on a designated flight route	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	List the meteorological information that a flight crew can receive from services during flight and apply the content of these information for the continuation of the flight	x
050 10 03 04	Meteorological warnings	
LO	Describe and interpret aerodrome warnings and wind shear warnings and alerts	x

AMC7 FCL.615(b) IR Theoretical knowledge and flight instruction

Detailed theoretical knowledge syllabus and learning objectives

Subject Radio Navigation (Competency-based modular training course (CB-IR(A)) for instrument rating according to Appendix 6 Aa and en-route instrument rating (EIR) course according to FCL.825)

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
062 00 00 00	**RADIO NAVIGATION**	
062 02 00 00	**RADIO AIDS**	
062 02 01 00	Ground D/F	
062 02 01 03	Coverage and range	
LO	Use the formula, 1,23 x √transmitter height in feet + 1,23 x √receiver height in feet, to calculate the range in NM	x
062 02 02 00	NDB/ADF	
062 02 02 01	Principles	
LO	Define the abbreviation NDB Non Directional Beacon	x
LO	Define the abbreviation ADF Automatic Direction Finder	x
LO	State that the NDB is the ground part of the system	x
LO	State that the ADF is the airborne part of the system	x
LO	State that NDB operates in the LF and MF frequency bands	x
LO	The frequency band assigned to aeronautical NDBs according to ICAO Annex 10 is 190–1750 kHz	x
LO	Define a locator beacon. An LF/MF NDB used as an aid to final app roach usually with a range, according to ICAO Annex 10, of 10–25 NM	x
LO	Explain the difference between NDBs and locator beacons	x
LO	Explain which beacons transmit signals suitable for use by an ADF	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	State that certain commercial radio stations transmit within the frequency band of the NDB	x
LO	Explain why it is necessary to use a directionally sensitive receiver antenna system in order to obtain the direction of the incoming radio wave	x
LO	Describe the use of NDBs for navigation	x
LO	Describe the procedure to identify an NDB station	x
LO	Interpret the term ‘cone of silence’ in respect of an NDB	x
LO	State that an NDB station emits a N0N/A1A or a NON/A2A signal	x
LO	State the function of the BFO (Beat Frequency Oscillator)	x
LO	State that in order to identify a NON/A1A NDB, the BFO circuit of the receiver has to be activated	x
LO	State that the NDB emitting NON/A1A gives rise to erratic indications of the bearing while the station is identifying	x
LO	Explain that on modern aircraft the BFO is activated automatically	x
062 02 02 02	Presentation and interpretation	
LO	Name the types of indicator in common use: — Electronic navigation display — Radio Magnetic Indicator RMI — Fixed card ADF (radio compass) — Moving card ADF	x
LO	Describe the indications given on RMI, fixed card and moving card ADF displays	x
LO	Given a display interpret the relevant ADF information	x
LO	Calculate the true bearing from the compass heading and relative bearing	x
LO	Convert the compass bearing into magnetic bearing and true bearing	x
LO	Describe how to fly the following in-flight ADF procedures according to Doc 8168 Vol. 1: — Homing and tracking and explain the influence of wind — Interceptions — Procedural turns — Holding patterns	x
062 02 02 03	Coverage and range	
LO	State that the power limits the range of an NDB	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	State that the range of an NDB over sea is better than over land due to better ground wave propagation over seawater than over land	x
LO	Describe the propagation path of NDB radio waves with respect to the ionosphere and the Earth's surface	x
LO	Explain that interference between sky and ground waves at night leads to 'fading'	x
LO	Define the accuracy the pilot has to fly the required bearing in order to be considered established during approach according to ICAO DOC 8168 as within ± 5°	x
LO	State that there is no warning indication of NDB failure	x
062 02 02 04	Errors and accuracy	
LO	Explain Coastal Refraction. As a radio wave travelling over land crosses the coast, the wave speeds up over water and the wave front bends	x
LO	Define Night/twilight effect. The influence of sky waves and ground waves arriving at the ADF receiver with a difference of phase and polarisation which introduce bearing errors	x
LO	State that interference from other NDB stations on the same frequency may occur at night due to sky wave contamination	x
062 02 02 05	Factors affecting range and accuracy	
LO	State that there is no coastal refraction error when: — The propagation direction of the wave is 90° to the coast line — The NDB station is sited on the coast line	x
LO	State that coastal refraction error increases with increased incidence.	x
LO	State that night effect predominates around dusk and dawn.	x
LO	Define multipath propagation of the radio wave (mountain effect).	x
LO	State that static emission energy from a cumulonimbus cloud may interfere with the radio wave and influence the ADF bearing indication.	x
062 02 03 00	VOR and Doppler-VOR	
062 02 03 01	Principles	
LO	State that the frequency band allocated to VOR according to ICAO Annex 10 is VHF and the frequencies used are 108.0–117.975 MHz	x
LO	State that frequencies in the allocated VOR range with the first decimal place an odd number, are used by ILS	x
LO	State that the following types of VOR are in operation: — Conventional VOR (CVOR) a first generation VOR station emitting signals by means of a rotating antenna	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
	— Doppler VOR (DVOR) a second generation VOR station emitting signals by means of a combination of fixed antennas utilising the Doppler principle — En-route VOR for use by IFR traffic — Terminal VOR (TVOR) a station with a shorter range used as part of the approach and departure structure at major airports — Test VOR (VOT) a VOR station emitting a signal to test VOR indicators in an aircraft	
LO	Describe how ATIS information is transmitted on VOR frequencies.	x
LO	List the three main components of VOR airborne equipment: — The antenna — The receiver — The indicator	x
LO	Describe the identification of a VOR in terms of Morse-code letters, continuous tone or dots (VOT), tone pitch, repetition rate and additional plain text	x
LO	State that failure of the VOR station to stay within the required limits can cause the removal of identification and navigation components from the carrier or radiation to cease	x
062 02 03 02	Presentation and interpretation	
LO	Read off the radial on a Radio Magnetic Indicator (RMI)	x
LO	Read off the angular displacement, in relation to a pre-selected radial on an HSI or CDI	x
LO	Explain the use of the TO/FROM indicator in order to determine aircraft position relative to the VOR considering also the heading of the aircraft	x
LO	Interpret VOR information as displayed on HSI, CDI and RMI	x
LO	Describe the following in-flight VOR procedures as in DOC 8168 Vol.1: — Tracking and explain the influence of wind when tracking — Interceptions — Procedural turns — Holding patterns	x
LO	State that when converting a radial into a true bearing, the variation at the VOR station has to be taken into account	x
062 02 03 03	Coverage and Range	
LO	Calculate the range using the formula: 1,23 x √transmitter height in feet + 1,23 x √receiver height in feet	x
062 02 03 04	Errors and accuracy	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Define the accuracy the pilot has to fly the required bearing in order to be considered established on a VOR track when flying approach procedures according to ICAO Doc 8168 as within half full scale deflection of the required track	x
LO	State that due to reflections from terrain, radials can be bent and lead to wrong or fluctuating indications which is called 'scalloping'.	x
062 02 04 00	DME	
062 02 04 01	Principles	
LO	State that DME operates in the UHF band between 960–1215 MHz according to ICAO Annex 10	x
LO	State that the system comprises two basic components: — The aircraft component, the interrogator — The ground component, the transponder	x
LO	State that the distance measured by DME is slant range	x
LO	Illustrate that a position line using DME is a circle with the station at its centre	x
LO	Describe how the pairing of VHF and UHF frequencies (VOR/DME) enables selection of two items of navigation information from one frequency setting	x
LO	Describe, in the case of co-location, the frequency pairing and identification procedure	x
LO	Explain that depending on the configuration, the combination of a DME distance with a VOR radial can determine the position of the aircraft	x
LO	Explain that military TACAN stations may be used for DME information	x
062 02 04 02	Presentation and interpretation	
LO	Explain that when identifying a DME station co-located with a VOR station, the identification signal with the higher tone frequency is the DME which idents approximately every 40 seconds	x
LO	Calculate ground distance given slant range and altitude	x
LO	Describe the use of DME to fly a DME arc in accordance with DOC 8168 Vol. 1	x
LO	State that a DME system may have a groundspeed read out combined with the DME read out	x
062 02 04 03	Coverage and Range	
LO	Explain why a ground station can generally respond to a maximum of 100 aircraft.	x
LO	Explain which aircraft will be denied a DME range first when more than 100 interrogations are being made	x
062 02 04 05	Factors affecting range and accuracy	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	State that the groundspeed read out combined with DME is only correct when tracking directly to or from the DME station	x
LO	State that, close to the station, the groundspeed read out combined with DME is less than the actual groundspeed	x
062 02 05 00	ILS	
062 02 05 01	Principles	
LO	Name the three main components of an ILS: — The localiser (LLZ) — The glide path (GP) — Range information (markers or DME)	x
LO	State the site locations of the ILS components: — The localiser antenna should be located on the extension of the runway centre line at the stop-end — The glide path antenna should be located 300 metres beyond the runway threshold, laterally displaced approximately 120 metres to the side of the runway centre line	x
LO	Explain that marker beacons produce radiation patterns to indicate predetermined distances from the threshold along the ILS glide path	x
LO	Explain that marker beacons are sometimes replaced by a DME paired with the LLZ frequency	x
LO	State that in the ILS frequency assigned band 108,0–111,975 MHz, only frequencies with the first decimal odd are ILS frequencies	x
LO	State that the LLZ operates in the VHF band 108,0–111,975 MHz according to ICAO Annex 10	x
LO	State that the GP operates in the UHF band	x
LO	State that both the LLZ and the GP antenna radiate side lobes (false beams) which could give rise to false centreline and false glide path indication	x
LO	Explain that the back beam from the LLZ antenna may be used as a published ‘non -precision approach’	x
LO	State that according to ICAO Annex 10 the nominal glide path is 3°	x
LO	State that according to ICAO DOC 8168, the final approach area contains a fix or facility that permits verification of the ILS glide path/altimeter relationship. The outer marker or DME is usually used for this purpose.	x
062 02 05 02	Presentation and interpretation	
LO	Describe the ILS identification regarding frequency and Morse code and/or plain text	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Calculate the rate of descent for a 3° glide path angle given the groundspeed of the aircraft using the formula: Rate of descent (ROD) in ft/min = groundspeed in kt x 10/2	x
LO	Calculate the rate of descent using the following formula when flying any glide path angle: ROD ft/min = Speed factor (SF) x glide path angle x 100	x
LO	Interpret the markers by sound, modulation, and frequency	x
LO	State that the outer marker cockpit indicator is coloured blue, the middle marker amber and the inner marker white	x
LO	State that a failure of either the LLZ or the GP to stay within predetermined limits will cause: — Removal of identification and navigation components from the carrier — Radiation to cease — A warning to be displayed at the designated control point	x
LO	State that an ILS receiver has an automatic monitoring function	x
LO	Interpret the indications on a Course Deviation Indicator (CDI) and a Horizontal Situation Indicator (HSI): — Full scale deflection of the CDI needle corresponds to approximately 2,5° displacement from the ILS centre line — Full scale deflection on the GP corresponds to approximately 0,7° from the ILS GP centre line	x
LO	Interpret the aircraft's position in relation to the extended runway centre line on a back -beam approach	x
LO	Explain the setting of the course pointer of an HSI for front -beam and back-beam approaches	x
062 02 05 03	Coverage and Range	
LO	Sketch the standard coverage area of the LLZ and GP with angular sector limits in degrees and distance limits from the transmitter in accordance with ICAO Annex 10: — LLZ coverage area is 10° on either side of the centre line to a distance of 25 NM from the runway, and 35° on either side of the centre line to a distance of 17 NM from the runway — GP coverage area is 8° on either side of the centre line to a distance of minimum 10 NM from the runway	x
062 02 05 04	Errors and accuracy	
LO	Explain that ILS approaches are divided into facility performance categories defined in ICAO Annex 10	x
LO	Explain the following in accordance with ICAO DOC 8168:	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
	— The accuracy the pilot has to fly the ILS localiser to be considered established on an ILS track is within half full scale deflection of the required track — The aircraft has to be established within half scale deflection of the LLZ before starting descent on the GP — The pilot has to fly the ILS GP to a maximum of half scale fly-up deflection of the GP in order to stay in protected airspace	
LO	State that if a pilot deviates by more than half scale deflection on the LLZ or by more than half course fly-up deflection on the GP, an immediate missed approach should be executed, because obstacle clearance may no longer be guaranteed	x
062 03 00 00	**RADAR**	
062 03 01 00	Pulse techniques and associated terms	
LO	Name the different applications of radar with respect to ATC, MET observations and airborne weather radar	x
LO	Describe the pulse technique and echo principle on which primary radar systems are based.	x
LO	Describe, in general terms, the effects of the following factors with respect to the quality of the target depiction on the radar display: — Atmospheric conditions; super refraction and sub refraction — Attenuation with distance — Condition and size of the reflecting surface	x
062 03 02 00	Ground Radar	
062 03 02 01	Principles	
LO	Explain that primary radar provides bearing and distance of targets.	x
LO	Explain that primary ground radar is used to detect aircraft that are not equipped with a secondary radar transponder.	x
LO	Explain why Moving Target Indicator (MTI) is used	x
062 03 02 02	Presentation and interpretation	
LO	State that modern ATC systems use computer generated display.	x
LO	Explain that the radar display enables the ATS controller to provide information, surveillance or guidance service.	x
062 03 03 00	Airborne Weather Radar	
062 03 03 01	Principles	
LO	List the two main tasks of the weather radar in respect of weather and navigation	x
LO	Explain how the antenna is attitude-stabilised in relation to the horizontal plane using the aircraft's attitude reference system	x
LO	Describe the cone shaped pencil beam of about 3° to 5° beam width used for weather depiction	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Explain that in modern AWRs a single radiation pattern is used for both mapping and weather with the scanning angle being changed between them	x
062 03 03 02	Presentation and interpretation	
LO	Explain the functions of the following different modes on the radar control panel — Off/on switch — Function switch, with modes WX, WX+T and MAP. — Gain control setting (auto/manual) — Tilt/auto tilt switch.	x
LO	Name, for areas of differing reflection intensity, the colour gradations (green, yellow, red and magenta) indicating the increasing intensity of precipitation	x
LO	Illustrate the use of azimuth marker lines and range lines in respect of the relative bearing and the distance to a thunderstorm or to a landmark on the screen	x
062 03 03 03	Coverage and Range	
LO	Explain how the radar is used for weather detection and for mapping (range, tilt and gain if available)	x
062 03 03 04	Errors, accuracy, limitations	
LO	Explain why AWR should be used with extreme caution when on the ground	x
062 03 03 05	Factors affecting range and accuracy	
LO	Explain the danger of the area behind heavy rain (shadow area) where no radar waves will penetrate	x
LO	Explain why the tilt setting should be higher when the aircraft descends to a lower altitude	x
LO	Explain why the tilt setting should be lower when the aircraft climbs to a higher altitude	x
LO	Explain why a thunderstorm may not be detected when the tilt is set too high	x
062 03 03 06	Application for navigation	
LO	Describe the navigation function of the radar in the mapping mode	x
LO	Describe the use of the weather radar to avoid a thunderstorm (Cb)	x
LO	Explain how turbulence (not CAT) can be detected by a modern weather radar	x
LO	Explain how wind shear can be detected by a modern weather radar	x
062 03 04 00	Secondary Surveillance Radar and transponder	
062 03 04 01	Principles	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Explain that the Air Traffic Control (ATC) system is based on the replies provided by the airborne transponders in response to interrogations from the ATC secondary radar	x
LO	Explain that the ground ATC secondary radar uses techniques which provide the ATC with information that cannot be acquired by primary radar	x
LO	Explain that an airborne transponder provides coded reply signals in response to interrogation signals from the ground secondary radar and from aircraft equipped with TCAS.	x
LO	Explain the advantages of SSR over a primary radar	x
062 03 04 02	Modes and codes	
LO	Explain that the interrogator transmits its interrogations in the form of a series of pulses.	x
LO	Name and explain the Interrogation modes: 1. Mode A and C 2. Intermode: Mode A/C/S all call Mode A/C only all call 3. Mode S: Mode S only all call Broadcast (no reply elicited) Selective	x
LO	State that Mode A designation is a sequence of four digits can be manually selected from 4096 available codes.	x
LO	State that in mode C reply the pressure altitude is reported in 100 ft increments.	x
LO	State that in addition to the information pulses provided, a special position identification pulse (SPI) can be transmitted but only as a result of a manual selection (IDENT)	x
LO	Explain the need for compatibility of Mode S with Mode A and C	x
LO	Explain that the Mode S transponders receive interrogations from other Mode S transponders and SSR ground stations	x
LO	State that Mode S surveillance protocols implicitly use the principle of selective addressing	x
LO	Explain that every aircraft will have been allocated an ICAO Aircraft Address which is hard coded into the airframe (Mode S address)	x
LO	Interpret the following mode S terms: — Selective addressing — Mode ‘all call’ — Selective call	x
LO	State that Mode S interrogation contains either: — Aircraft address	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
	— All-call address — Broadcast address	
LO	State that the Aircraft Address shall be transmitted in any reply except in Mode S only all-call reply	x
062 03 04 03	Presentation and interpretation	
LO	Explain how an aircraft can be identified by a unique code	x
LO	Illustrate how the following information is presented on the radar screen: — Pressure altitude — Flight level — Flight number or aircraft registration — Ground speed	x
LO	Name and interpret the codes 7700, 7600 and 7500	x
LO	Interpret the selector modes: OFF, Standby, ON (mode A), ALT (mode A and C) and TEST	x
LO	Explain the function of the emission of a SPI (Special Position Identification) pulse after pushing the IDENT button in the aircraft	x
	ELEMENTARY SURVEILLANCE	
LO	Explain that the elementary surveillance provides the ATC controller with aircraft position, altitude and identification	x
LO	State that the elementary surveillance needs MODE S transponders with surveillance identifier (SI) code capacity and the automatic reporting of aircraft identification, known as ICAO level 2s	x
LO	State that the SI code must correspond to the aircraft identification specified in item 7 of the ICAO flight plan or to the registration marking	x
062 03 04 04	Errors and Accuracy	
LO	Explain the following disadvantages of SSR (mode A/C): — Code garbling of aircraft less than 1.7 NM apart measured in the vertical plane perpendicular to and from the antenna — ‘Fruiting’ which results from reception of replies caused by interrogations from other radar stations	x
062 05 00 00	**AREA NAVIGATION SYSTEMS, RNAV/FMS**	
062 05 01 00	General philosophy and definitions	
062 05 01 01	Basic RNAV (B-RNAV)/precision RNAV (P-RNAV)/ RNP-PNAV	
LO	Define area navigation RNAV (ICAO Annex 11). A method of navigation permitting aircraft operations on any desired track within the coverage of station-referenced navigation signal, or within the limits of a self-contained navigation system	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	State that basic RNAV (B-RNAV) systems require RNP 5	x
LO	State that precision RNAV (PRNAV) systems require RNP 1	x
062 05 01 02	Principles of 2D RNAV, 3D RNAV and 4D RNAV	
LO	State that a 2D RNAV system is able to navigate in the horizontal plane only.	x
LO	State that a 3D RNAV system is able to navigate in the horizontal plane and in addition has a guidance capability in the vertical plane.	x
LO	State that a 4D RNAV system is able to navigate in the horizontal plane, has a guidance capability in the vertical plane and in addition has a timing function	x
062 05 01 03	Required Navigation Performance (RNP) in accordance with ICAO DOC 9613	
LO	State that RNP is a concept that applies to navigation performance within an airspace	x
LO	The RNP type is based on the navigation performance accuracy to be achieved within the air space.	x
LO	State that RNP X requires a navigation performance accuracy of ± X NM both lateral and longitudinal 95 % of the flying time. (RNP 1 requires a navigation performance of ±1 NM both lateral and longitudinal 95 % of the flying time)	x
LO	State that RNAV equipment is one requirement, in order to receive approval to operate in a RNP environment	x
LO	State that RNAV equipment operates by automatically determining the aircraft position.	x
LO	State the advantages of using RNAV techniques over more conventional forms of navigation: — Establishment of more direct routes permitting a reduction in flight distance — Establishment of dual or parallel routes to accommodate a greater flow of en-route traffic — Establishment of bypass routes for aircraft over flying high-density terminal areas — Establishment of alternatives or contingency routes on either a planned or ad hoc basis — Establishment of optimum locations for holding patterns — Reduction in the number of ground navigation facilities	x
LO	State that RNP may be specified for a route, a number of routes, an area, volume of airspace or any airspace of defined dimensions.	x
LO	State that airborne navigation equipment uses inputs from navigational systems such as VOR/DME, DME/DME, GNSS, INS and IRS.	x
LO	State that aircraft equipped to operate to RNP 1 and better, should be able to compute an estimate of its position error, depending on the sensors being used and time elapsed	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Indicate navigation equipment failure.	x
062 05 02 00	Simple 2D RNAV	
	Info: First generation of radio navigation systems allowing the flight crew to select a phantom waypoint on the RNAV panel and select a desired track to fly inbound to the waypoint.	
062 05 02 01	Flight deck equipment	
LO	The control unit allows the flight crew to: — Tune the VOR/DME station used to define the phantom waypoint — Define the phantom waypoint as a radial and distance (DME) form the selected VOR/DME station — Select desired magnetic track to follow inbound to the phantom waypoint — Select between an en-route mode, an approach mode of operation and the basic VOR/DME mode of operation	x
LO	Track guidance is shown on the HSI/CDI.	x
062 05 02 02	Navigation computer, VOR/DME navigation	
LO	The navigation computer of the simple 2D RNAV system computes the navigational problems by simple sine and cosine mathematics, solving the triangular problems.	x
062 05 02 03	Navigation computer input/output	
LO	State the following input data to the navigation computer is: — Actual VOR radial and DME distance from selected VOR station — Radial and distance to phantom waypoint — Desired magnetic track inbound to the phantom waypoint	x
LO	State the following output data from the navigation computer: — Desired magnetic track to the phantom waypoint shown on the CDI at the course pointer — Distance from present position to the phantom waypoint — Deviations from desired track as follows: — In en-route mode full scale deflection on the CDI is 5 NM — In approach mode full scale deflection on the CDI is 1¼ NM — In VOR/DME mode full scale deflection of the CDI is 10°.	x
LO	State that the system is limited to operate within range of selected VOR/DME station	x
062 05 03 00	4D RNAV	
	Info: The next generation of area navigation equipment allowed the flight crew to navigate on any desired track within coverage of VOR/DME stations	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
062 05 03 01	Flight deck equipment	
LO	State that in order to give the flight crew control over the required lateral guidance functions, RNAV equipment should at least be able to perform the following functions: Display present position in latitude/longitude or as distance/bearing to selected waypoint; — Select or enter the required flight plan through the control and display unit (CDU); — Review and modify navigation data for any part of a flight plan at any stage of flight and store sufficient data to carry out the active flight plan; — Review, assemble, modify or verify a flight plan in flight, without affecting the guidance output; — Execute a modified flight plan only after positive action by the flight crew; — Where provided, assemble and verify an alternative flight plan without affecting the active flight plan; — Assemble a flight plan, either by identifier or by selection of individual waypoints from the database, or by creation of waypoints from the database, or by creation of waypoints defined by latitude/longitude, bearing/distance parameters or other parameters; — Assemble flight plans by joining routes or route segments; — Allow verification or adjustment of displayed position; — Provide automatic sequencing through waypoints with turn anticipation. Manual sequencing should also be provided to allow flight over, and return to, waypoints; — Display cross-track error on the CDU; — Provide time to waypoints on the CDU; — Execute a direct clearance to any waypoint; — Fly parallel tracks at the selected offset distance; offset mode should be clearly indicated; — Purge previous radio updates; — Carry out RNAV holding procedures (when defined); — Make available to the flight crew estimates of positional uncertainty, either as a quality factor or by reference to sensor differences from the computed position; — Conform to WGS-84 geodetic reference system;	x
	— Indicate navigation equipment failure.	
062 05 04 00	FMS and general terms	
062 05 04 03	Navigation data base	
LO	State that the navigation database of the FMC may contain the following data: — Reference data for airports (four letter ICAO identifier) — VOR/DME station data (three letter ICAO identifier) — Waypoint data (five letter ICAO identifier) — STAR data	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
	— SID data — Holding patterns — Airport runway data — NDB stations (alphabetic ICAO identifier) — Company flight plan routes	
LO	State that the navigation database is updated every 28 days.	x
LO	State that the navigational database is write protected, but additional space exists so that crew created navigational data may be saved in the computer memory. Such additional data will also be deleted at the 28 days navigational update of the database.	x
062 05 04 06	Determination of the FMS-position of the aircraft	
LO	State that modern FMS may use a range of sensors for calculating the position of the aircraft including VOR, DME, GPS, IRS and ILS.	x
062 06 00 00	**GLOBAL NAVIGATION SATELLITE SYSTEMS**	
062 06 01 00	GPS/GLONASS/GALILEO	
062 06 01 01	Principles	
LO	State that there are two main Global Navigation Satellite Systems (GNSS) currently in existence with a third which is planned to be fully operational by 2011. They are: — USA NAVSTAR GPS (NAVigation System with Timing And Ranging Global Positioning System — Russian GLONASS (GLObal NAvigation Satellite System) — European GALILEO	x
LO	State that all 3 systems (will) consist of a constellation of satellites which can be used by a suitably equipped receiver to determine position	x
062 06 01 02	Operation	
	NAVSTAR GPS	
LO	State that there are currently two modes of operation, SPS (Standard Positioning Service) for civilian users, and PPS (Precise Positioning Service for authorised users	x
LO	SPS was originally designed to provide civil users with a less accurate positioning capability than PPS	x
LO	Name the three segments as: — Space segment — Control segment — User segment	x
	Space segment	

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	State that the space segment consists of a notional constellation of 24 operational satellites	x
LO	State that it takes 12½ minutes for a GPS receiver to receive all the data frames in the navigation message	x
LO	State that the almanac contains the orbital data about all the satellites in the GPS constellation	x
LO	State that the ephemeris contains data used to correct the orbital data of the satellites due to small disturbances	x
LO	State that the clock correction parameters are data for correction of the satellite time	x
LO	State that UTC parameters are factors determining the difference between GPS time and UTC	x
LO	State that an ionospheric model is currently used to calculate the time delay of the signal travelling through the ionosphere.	x
LO	State that the GPS health message is used to exclude unhealthy satellites from the position solution. Satellite health is determined by the validity of the navigation data	x
LO	State that GPS uses the WGS 84 model	x
LO	State that satellites are equipped with atomic clocks, which allow the system to keep very accurate time reference	x
	Control Segment	
LO	State that the control segment comprises: — A master control station — Ground antenna — Monitoring stations	x
	User Segment	
LO	State that GPS supplies three-dimensional position fixes and speed data, plus a precise time reference	x
LO	State that the GPS receiver used in aviation is a multi -channel type	x
LO	State that a GPS receiver is able to determine the distance to a satellite, by determining the difference between the time of transmission by satellite and the time of reception	x
LO	State that the initial distance calculated to the satellites is called pseudo range because the difference between the GPS receiver and the satellite time references initially creates an erroneous range	x
LO	State that each range defines a sphere with its centre at the satellite	x
LO	State that three satellites are needed to determine a two-dimensional position	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	State that four spheres are needed to calculate a three dimensional position, hence four satellites are required	x
LO	State that the GPS receiver is able to synchronise to the correct time base when receiving four satellites	x
	NAVSTAR GPS Integrity	
LO	Define RAIM (Receiver Autonomous Integrity Monitoring). A technique whereby a receiver processor determines the integrity of the navigation signals	x
LO	State that RAIM is achieved by consistency check among pseudo range measurements	x
LO	State that basic RAIM requires 5 satellites. A 6th is for isolating a faulty satellite from the navigation solution	x
LO	State that when a GPS receiver uses barometric altitude as an augmentation to RAIM, the number of satellites needed for the receiver to perform the RAIM function may be reduced by one	x
062 06 01 03	Errors and Factors affecting accuracy	
LO	List the most significant factors affecting accuracy: — Ionospheric propagation delay — Dilution of position — Satellite clock error — Satellite orbital variations — Multipath	x
062 06 02 00	Ground, Satellite and Airborne based augmentation systems	
	Satellite Based Augmentation Systems (SBAS)	
LO	Explain the principle of a SBAS : to measure on the ground the signal errors transmitted by GNSS satellites and transmit differential corrections and integrity messages for navigation satellites	x
LO	State that the frequency band of the data link is identical to that of the GPS signals.	x
LO	Explain that the use of geostationary satellites enables messages to be broadcast over very wide areas	x
LO	Explain that pseudo-range measurements to these geostationary satellites can also be made, as if they were GPS satellites	x
LO	Stat that SBAS consists of 3 elements : — The ground infrastructure (monitoring and processing stations), — The SBAS satellites, — The SBAS airborne receivers.	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB-IR (A) and EIR
LO	Explain that SBAS can provide approach and landing operations with Vertical guidance (APV) and precision approach service	x
LO	Explain the difference between Coverage area and Service area	x
LO	State that Satellite Based Augmentation Systems include: — EGNOS in Western Europe and the Mediterranean — WAAS in USA — MSAS in Japan — GAGAN in India	x
	EGNOS	
LO	State that (EGNOS) European Geostationary Navigation Overlay Service consists of 3 geostationary Inmarsat satellites which broadcast GPS look-alike signals	x
LO	State that EGNOS is designed to improve accuracy to 1–2 m horizontally and 3–5 m vertically	x
LO	Explain that integrity and safety are improved by alerting users within 6 seconds if a GPS malfunction occurs (up to 3 hrs GPS alone)	x
	Airborne Based Augmentation Systems (ABAS)	
LO	Explain the principle of ABAS: to use redundant elements within the GPS constellation (e.g. : multiplicity of distance measurements to various satellites) or the combination of GNSS measurements with those of other navigation sensors (such as inertial systems), to develop integrity control	x
LO	State that the type of ABAS using only GNSS information is RAIM (Receiver Autonomous Integrity Monitoring)	x
LO	State that a system using information from additional on-board sensors is named AAIM (Aircraft Autonomous Integrity Monitoring)	x
LO	Explain that the typical sensors used are barometric altimeter , clock and inertial navigation system	x
LO	Explain that unlike GBAS and SBAS , ABAS does not improve positioning accuracy	x

AMC8 FCL.615(b) IR Theoretical knowledge and flight instruction

Detailed theoretical knowledge syllabus and learning objectives

Subject IFR Communications (Competency-based modular training course (CB-IR(A)) for instrument rating according to Appendix 6 Aa and en route instrument rating (EIR) course according to FCL.825)

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
092 00 00 00	**IFR COMMUNICATIONS**	

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
092 01 00 00	**DEFINITIONS**	
092 01 01 00	Meanings and significance of associated terms	
LO	As for VFR plus terms used in conjunction with approach and holding procedures	x
092 01 02 00	Air Traffic Control abbreviations	
LO	As for VFR plus additional IFR related terms	x
092 01 03 00	Q-code groups commonly used in RTF air-ground communications	
LO	Define Q-code groups commonly used in RTF air to ground communications: — Pressure settings — Directions and bearings	x
LO	State the procedure for obtaining a bearing information in flight	x
092 01 04 00	Categories of messages	
LO	List the categories of messages in order of priority	x
LO	Identify the types of messages appropriate to each category	x
LO	List the priority of a message (given examples of messages to compare)	x
092 02 00 00	**GENERAL OPERATING PROCEDURES**	
092 02 01 00	Transmission of letters	
LO	State the phonetic alphabet used in radiotelephony	x
LO	Identify the occasions when words should be spelt	x
092 02 02 00	Transmission of numbers (including level information)	
LO	Describe the method of transmitting numbers — Pronunciation — Single digits, whole hundreds and whole thousands	x
092 02 03 00	Transmission of time	
LO	Describe the ways of transmitting time — Standard time reference (UTC) — Minutes, minutes and hours, when required	x
092 02 04 00	Transmission technique	
LO	Explain the techniques used for making good R/T transmissions	x
092 02 05 00	Standard words and phrases (relevant RTF phraseology included)	

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	Define the meaning of standard words and phrases	x
LO	Use correct standard phraseology for each phase of IFR flight — Pushback — IFR departure — Airways clearances — Position reporting — Approach procedures — IFR arrivals	x
092 02 06 00	Radiotelephony call signs for aeronautical stations including use of abbreviated call signs	
LO	As for VFR	x
LO	Name the two parts of the call sign of an aeronautical station	x
LO	Identify the call sign suffixes for aeronautical stations	x
LO	Explain when the call sign may be abbreviated to the use of suffix only	x
092 02 07 00	Radiotelephony call signs for aircraft including use of abbreviated call signs	
LO	As for VFR	x
LO	Explain when the suffix ‘HEAVY’ should be used with an aircraft call sign	x
LO	Explain the use of the phrase ‘Change your call sign to …’	x
LO	Explain the use of the phrase ‘Revert to flight plan call sign’	x
092 02 08 00	Transfer of communication	
LO	Describe the procedure for transfer of communication — By ground station — By aircraft	x
092 02 09 00	Test procedures including readability scale; establishment of RTF communication	
LO	Explain how to test radio transmission and reception	x
LO	State the readability scale and explain its meaning	x
092 02 10 00	Read back and acknowledgement requirements	
LO	State the requirement to read back ATC route clearances	x
LO	State the requirement to read back clearances related to runway in use	x
LO	State the requirement to read back other clearances including conditional clearances	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	State the requirement to read back data such as runway, SSR codes etc	x
092 02 11 00	Radar procedural phraseology	
LO	Use the correct phraseology for an aircraft receiving a radar service — Radar identification — Radar vectoring — Traffic information and avoidance — SSR procedures	x
092 02 12 00	Level changes and reports	
LO	Use the correct term to describe vertical position In relation to flight level (standard pressure setting) — In relation to Altitude (metres/feet on QNH) — In relation to Height (metres/feet on QFE)	x
092 03 00 00	**ACTION REQUIRED TO BE TAKEN IN CASE OF COMMUNICATION FAILURE**	
LO	Describe the action to be taken in communication failure on a IFR flight	x
LO	Describe the action to be taken in case of communication failure on a IFR flight when flying in VMC and the flight will be terminated in VMC	x
LO	Describe the action to be taken in case of communication failure on a IFR flight when flying in IMC	x
092 04 00 00	**DISTRESS AND URGENCY PROCEDURES**	
092 04 01 00	PAN medical	
LO	Describe the type of flights to which PAN MEDICAL applies	x
LO	List the content of a PAN MEDICAL message in correct sequence	x
092 04 02 00	Distress (definition — frequencies — watch of distress frequencies — distress signal — distress message)	
LO	State the DISTRESS procedures	x
LO	Define DISTRESS	x
LO	Identify the frequencies that should be used by aircraft in DISTRESS	x
LO	Specify the emergency SSR codes that may be used by aircraft, and the meaning of the codes	x
LO	Describe the action to be taken by the station which receives a DISTRESS message	x
LO	Describe the action to be taken by all other stations when a DISTRESS procedure is in progress	x

Syllabus reference	Syllabus details and associated Learning Objectives	CB- IR(A) and EIR
LO	List the content of a DISTRESS message	x
092 04 03 00	Urgency (definition — frequencies — urgency signal — urgency message)	
LO	State the URGENCY procedures	x
LO	Define URGENCY	x
LO	Identify the frequencies that should be used by aircraft in URGENCY	x
LO	Describe the action to be taken by the station which receives an URGENCY message	x
LO	List the content of an URGENCY signal/message in the correct sequence	x
092 05 00 00	**RELEVANT WEATHER INFORMATION TERMS (IFR)**	
092 05 01 00	Aerodrome weather	
	As for VFR plus the following	
	Runway visual range	
	Braking action (friction coefficient)	
092 05 02 00	Weather broadcast	
	As for VFR plus the following	
	Explain when aircraft routine meteorological observations should be made	
	Explain when aircraft Special meteorological observations should be made	
092 06 00 00	**GENERAL PRINCIPLES OF VHF PROPAGATION AND ALLOCATION OF FREQUENCIES**	
	Describe the radio frequency spectrum with particular reference to VHF	
	State the names of the bands into which the radio frequency spectrum is divided	
	Identify the frequency range of the VHF band	
	Name the band normally used for Aeronautical Mobile Service voice communications	
	State the frequency separation allocated between consecutive VHF frequencies	
	Describe the propagation characteristics of radio transmissions in the VHF band	
	Describe the factors which reduce the effective range and quality of radio transmissions	
	State which of these factors apply to the VHF band	
	Calculate the effective range of VHF transmissions assuming no attenuating factors	
092 07 00 00	**MORSE CODE**	
	Identify radio navigation aids (VOR, DME, NDB, ILS) from their Morse code identifiers	
	SELCAL, TCAS, ACARS phraseology and procedures	

GM1 FCL.615(b) IR Theoretical knowledge and flight instruction

Detailed theoretical knowledge syllabus and learning objectives for the EIR and CB-IR(A)

The detailed theoretical knowledge syllabus is combined with the Learning Objectives (LOs).

The LOs refer to measurable statements of the skills and/or knowledge that a student should be able to demonstrate following a defined element of training. The LOs define the theoretical knowledge that a student should have assimilated on successful completion of an approved theoretical knowledge course and/or prior to undertaking the theoretical knowledge examinations.

The LOs are intended to be used by the training industry when developing Part- FCL theoretical knowledge courses. It should be noted, however, that the LOs do not provide a ready-made ground training syllabus for individual approved training organisations, and should not be seen by organisations as a substitute for thorough course-design.

For the preparation of theoretical knowledge courses for the issue of instrument ratings, the following information should be taken into account:

Subject Air Law

Subject Air Law is primarily based on ICAO documentation but will also refer to the future European operational rules and the requirements dealing with pilot licensing.

National Law should not be taken into account but remains relevant during practical training and operational flying.

Abbreviations used are ICAO abbreviations listed in ICAO Doc 8400, Abbreviations and Codes.

Where an LO refers to a definition e.g. 'Define the following terms' or 'Define and understand' or 'Explain the definitions in …', candidates are also expected to be able to recognise a given definition

Subject Flight Planning and Flight Monitoring

To fully appreciate and understand the subject Flight Planning and Flight Monitoring, the applicant will benefit from background knowledge in subjects Air Law, Aircraft General Knowledge, Mass & Balance, Performance, Meteorology, Navigation, Operational Procedures and Principles of Flight.

The reference to the relevant requirements of the Regulation on Air Operations is specifically mentioned in the LOs and should be used for reference as required.

The Jeppesen Student Pilots' Training Route Manual (SPTRM), otherwise known as the Training Route Manual (TRM), contains planning data plus Aerodrome and Approach charts that may be used in theoretical knowledge training courses.

AMC1 FCL.625(c) IR Validity, revalidation and renewal

RENEWAL OF INSTRUMENT RATING AT AN APPROVED TRAINING ORGANISATION (ATO): REFRESHER TRAINING

(a) The objective of the refresher training at an ATO is to reach the level of proficiency needed to pass the instrument rating proficiency check, as described in Appendix 9, or the instrument rating skill test as described in Appendix 7 to Part-FCL, as applicable. The amount of refresher training needed should be determined by the ATO on a case-by-case basis, taking into account the following factors:
   (1) the experience of the applicant;
   (2) the amount of time elapsed since the privileges of the rating were last used;
   (3) the complexity of the aircraft;
   (4) whether the applicant has a current rating on another aircraft type or class; and

(5) where considered necessary, the performance of the applicant during a simulated proficiency check for the rating in a flight simulation training device (FSTD) or an aircraft of a relevant type or class.

The amount of training needed to reach the desired level of competency should increase with the time elapsed since the privileges of the rating were last used.

(b) Once the ATO has determined the needs of the applicant, it should develop an individual training programme based on the ATO's approved course for the rating and focusing on those aspects where the applicant has shown the greatest needs. Theoretical-knowledge instruction should be included, as necessary. The performance of the applicant should be reviewed during the training, and additional instruction should be provided where necessary to reach the standard required for the proficiency check.

(c) After successful completion of the training, the ATO should provide a training completion certificate to the applicant, which describes the evaluation of the factors listed under (a) above and the training received, and includes a statement that the training has been successfully completed. The training completion certificate should be presented to the examiner prior to the proficiency check. Following the successful renewal of the rating, the training completion certificate and examiner report form should be submitted to Kuwait DGCA.

(d) **Taking into account the factors listed in (a) above, an ATO may also decide that the applicant already possesses the required level of proficiency and that no refresher training is necessary. In such a case, the certificate or other documental evidence referred to in point (c) above should contain a respective statement including sufficient reasoning.**

(d) Subpart H - Class and Type Ratings

GM1 FCL.700 Circumstances in which class or type ratings are required

List of class or type ratings

The following tables contain lists of aeroplanes or TMG that are included in class ratings.

Class ratings (aeroplane): SP and SEP or MEP aeroplane (land or sea):

Manufacturer	Aeroplanes		Licence Endorsement
All manufacturers	SEP (land)	(D)	SEP (land)
	SEP (land) with variable pitch propellers		
	SEP (land) with retractable undercarriage		
	SEP (land) with turbo or super charged engines		
	SEP (land) with cabin pressurisation		
	SEP (land) with tail wheels		
	SEP (land) with EFIS		
	SEP (land) with SLPC		
	SEP (sea)	(D)	SEP (sea)
	SEP (sea) with variable pitch propellers		
	SEP (sea) with turbo or super charged engines		
	SEP (sea) with cabin pressurisation		
	SEP (sea) with EFIS		
	SEP (sea) with SLPC		
All manufacturers	MEP (land)	(D)	MEP (land)
	MEP (sea)	(D)	MEP (sea)

Class ratings (aeroplane): SP and SEP TMG (land):

Manufacturer	Aeroplanes		Licence Endorsement
All manufacturers	All TMGs having an integrally mounted, non-retractable engine and a non- retractable propeller		TMG

Additional class and type rating lists and endorsement lists are published by the European Aviation Safety Agency (EASA) and will be used by the Kuwait DGCA when processing aircrew licences.

Whenever (D) is indicated in one of the lists mentioned in paragraphs (a) to (c), it indicates that differences training in accordance with FCL.710 is required.

GM1 FCL.710 Class and type ratings - variants

Differences and familiarisation training

(a) Differences training requires the acquisition of additional knowledge and training on an appropriate training device or the aircraft.

(b) Familiarisation training requires the acquisition of additional knowledge.

AMC1 FCL.725(a) Requirements for the issue of class and type ratings

Syllabus of theoretical knowledge for class or type ratings

I. SE and ME Aeroplanes

(a) Detailed listing for aeroplane structure and equipment, normal operation of systems and malfunctions:

(1) dimensions: minimum required runway width for 180 ° turn.

(2) engine including auxiliary power unit:

(i) type of engine or engines;

(ii) in general, function of the following systems or components:

(A) engine;

(B) auxiliary power unit;

(C) oil system;

(D) fuel system;

(E) ignition system;

(F) starting system;

(G) fire warning and extinguishing system;

(H) generators and generator drives;

(I) power indication;

(J) reverse thrust;

(K) water injection.

(iii) on piston or turbine-propeller engines additionally:

(E) propeller system;

(F) feathering system.

(iv) engine controls (including starter), engine instruments and indications in the cockpit, their function, interrelation and interpretation;

(v) engine operation, including APU, during engine start, start and engine malfunctions, procedures for normal operation in the correct sequence.

(3) fuel system:

(i) location of the fuel tanks, fuel pumps, fuel lines to the engines, tank capacities, valves and measuring;

(ii) location of the following systems:

(A) filtering;

(B) heating;

(C) fuelling and defueling;

(D) dumping;

(E) venting.

(iii) in the cockpit:

(A) the monitors and indicators of the fuel system;

(B) quantity and flow indication, interpretation.

(iv) procedures:

(A) fuel procedures distribution into the various tanks;

(B) fuel supply, temperature control and fuel dumping.

(4) pressurisation and air conditioning:

(i) components of the system and protection devices;

(ii) cockpit monitors and indicators;

(iii) interpretation about the operational condition;

(iv) normal operation of the system during start, cruise, approach and landing, air conditioning airflow and temperature control.

(5) ice and rain protection, windshield wipers and rain repellent:

(i) ice protected components of the aeroplane including engines, heat sources, controls and indications;

(ii) operation of the anti-icing or de-icing system during take-off, climb, cruise and descent, conditions requiring the use of the protection systems;

(iii) controls and indications of the windshield wipers and rain repellent systems operation.

(6) hydraulic system:

(i) components of the hydraulic system(s), quantities and system pressure, hydraulically actuated components associated to the respective hydraulic system;

(ii) controls, monitors and indicators in the cockpit, function and interrelation and interpretation of indications.

(7) landing gear:

(i) main components of the:

(A) main landing gear;

(B) nose gear;

(C) gear steering;

(D) wheel brake system, including anti-skid.

(ii) gear retraction and extension (including changes in trim and drag caused by gear operation);

(iii) required tyre pressure, or location of the relevant placard;

(iv) controls and indicators including warning indicators in the cockpit in relation to the retraction or extension condition of the landing gear and brakes;

(v) components of the emergency extension system.

(8) flight controls and high lift devices:

(i)

(A) aileron system;

(B) elevator system;

(C) rudder system;

(D) trim system;

(E) spoiler system;

(F) lift devices;

(G) stall warning system;

(H) take-off configuration warning system.

(ii) flight control system from the cockpit controls to the flight control or surfaces;

(iii) controls, monitors and indicators including warning indicators of the systems mentioned under (8) (i), interrelation and dependencies.

(9) electrical power supply:

(i) number, power, voltage, frequency and location of the main power system (AC or DC), auxiliary power system location and external power system;

(ii) location of the controls, monitors and indicators in the cockpit;

(iii) flight instruments, communication and navigation systems, main and back-up power sources;

(iv) location of vital circuit breakers;

(v) generator operation and monitoring procedures of the electrical power supply.

(10) flight instruments, communication, radar and navigation equipment, auto flight and flight data recorders:

(i) visible antennae;

(ii) controls and instruments of the following equipment in the cockpit during normal operation:

(A) flight instruments;

(B) flight management systems;

(C) radar equipment, including radio altimeter;

(D) communication and navigation systems;

(E) autopilot;

(F) flight data recorder, cockpit voice recorder and data-link communication recording function;

(G) TAWS;

(H) collision avoidance system;

(I) warning systems.

(11) cockpit, cabin and cargo compartment:

(i) operation of the exterior, cockpit, cabin and cargo compartment lighting and the emergency lighting;

(ii) operation of the cabin and cargo doors, stairs, windows and emergency exits;

(iii) 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.

(12) emergency equipment operation and correct application of the following emergency equipment in the aeroplane:

(i) portable fire extinguisher;

(ii) first-aid kits;

(iii) portable oxygen equipment;

(iv) emergency ropes;

(v) life-jacket;

(vi) life rafts;

(vii) emergency transmitters;

(viii) crash axes;

(ix) megaphones;

(x) emergency signals.

(13) pneumatic system:

(i) components of the pneumatic system, pressure source and actuated components;

(ii) controls, monitors and indicators in the cockpit and function of the system;

(iii) vacuum system.

(b) Limitations:

(1) general limitations:

(i) certification of the aeroplane, category of operation, noise certification and maximum and minimum performance data for all flight profiles, conditions and aircraft systems:

(A) maximum tail and crosswind-components at take-off and landing;

(B) maximum speeds for flap extension Vfo;

(C) at various flap settings Vfe;

(D) for landing gear operation Vlo, Mlo;

(E) for extended landing gear Vle, Mle;

(F) for maximum rudder deflection Va, Ma;

(G) for tyres;

(H) one propeller feathered.

(ii)

(A) minimum control speed air Vmca;

(B) minimum control speed ground Vmcg;

(C) stall speed under various conditions Vso, Vs1;

(D) maximum speed Vne, Mne;

(E) maximum speed for normal operation Vmo, Mmo;

(F) altitude and temperature limitations;

(G) stick shaker activation.

(iii)

(A) maximum airport pressure altitude, runway slope;

(B) maximum taxi mass;

(C) maximum take-off mass;

(D) maximum lift off mass;

(E) maximum landing mass;

(F) zero fuel mass;

(G) maximum dumping speed Vdco, Mdco, Vdce, Mdce;

(H) maximum load factor during operation;

(I) certificated range of centre of gravity.

(2) engine limitations:

(i) operating data of the engines:

(A) time limits and maximum temperatures;

(B) minimum RPMs and temperatures;

(C) torque;

(D) maximum power for take-off and go-around on pressure altitude or flight altitude and temperature;

(E) piston engines: certified range of mixture;

(F) minimum and maximum oil temperature and pressure;

(G) maximum starter time and required cooling;

(H) time between two start attempts for engines and auxiliary power unit;

(I) for propeller: maximum RPM of propeller triggering of automatic feathering device.

(ii) certified oil grades.

(3) systems limitations:

(i) operating data of the following systems:

(A) pressurisation, air conditioning maximum pressures;

(B) electrical power supply, maximum load of main power system (AC or DC);

(C) maximum time of power supply by battery in case of emergency;

(D) mach trim system and yaw damper speed limits;

(E) autopilot limitations of various modes;

(F) ice protection;

(G) speed and temperature limits of window heat;

(H) temperature limits of engine and wing anti-ice.

(ii) fuel system: certified fuel specifications, minimum and maximum pressures and temperature of the fuel.

(4) minimum equipment list.

(c) Performance, flight planning and monitoring:

(1) performance calculation about speeds, gradients, masses in all conditions for take- off, en-route, approach and landing according to the documentation available (for example for take-off V1, Vmbe, Vr, Vlof, V2, take-off distance, maximum take-off mass and the required stop distance) on the following factors:

(i) accelerate or stop distance;

(ii) take-off run and distance available (TORA, TODA);

(iii) ground temperature, pressure altitude, slope, wind;

(iv) maximum load and maximum mass (for example ZFM);

(v) minimum climb gradient after engine failure;

(vi) influence of snow, slush, moisture and standing water on the runway;

(vii) possible single or dual engine failure during cruise flight;

(viii) use of anti-icing systems;

(ix) failure of water injection system or antiskid system;

(x) speeds at reduced thrust, V1, V1red, Vmbe, Vmu, Vr, Vlof, V2;

(xi) safe approach speed Vref, on Vmca and turbulent conditions;

(xii) effects of excessive approach speed and abnormal glideslope on the landing distance;

(xiii) minimum climb gradient during approach and landing;

(xiv) limiting values for a go-around with minimum fuel;

(xv) maximum allowable landing mass and the landing distance for the destination and alternate aerodrome on the following factors:

(A) available landing distance;

(B) ground temperature, pressure altitude, runway slope and wind;

(C) fuel consumption to destination or alternate aerodrome;

(D) influence of moisture on the runway, snow, slush and standing water;

(E) failure of the water injection system or the anti skid system;

(F) influence of thrust reverser and spoilers.

(2) flight planning for normal and abnormal conditions:

(i) optimum or maximum flight level;

(ii) minimum required flight altitude;

(iii) drift down procedure after an engine failure during cruise flight;

(iv) power setting of the engines during climb, cruise and holding under various circumstances, as well as the most economic cruising flight level;

(v) calculation of a short range or long range flight plan;

(vi) optimum and maximum flight level and power setting of the engines after engine failure.

(3) flight monitoring.

(d) Load and balance and servicing:

(1) load and balance:

(i) load and trim sheet on the maximum masses for take-off and landing;

(ii) centre of gravity limits;

(iii) influence of fuel consumption on the centre of gravity;

(iv) lashing points, load clamping, maximum ground load.

(2) servicing on ground, servicing connections for:

(i) fuel;

(ii) oil;

(iii) water;

(iv) hydraulic;

(v) oxygen;

(vi) nitrogen;

(vii) conditioned air;

(viii) electric power;

(ix) start air;

(x) toilet and safety regulations.

Emergency procedures:

(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 Kuwait DGCA for certification:

(i) engine failure during take-off before and after v1, as well as in-flight;

(ii) malfunctions of the propeller system;

(iii) engine overheat, engine fire on ground and in-flight;

(iv) wheel well fire;

(v) electrical smoke or fire;

(vi) rapid decompression and emergency descent;

(vii) air-conditioning overheat, anti-ice system overheat;

(viii) fuel pump failure;

(ix) fuel freezing overheat;

(x) electric power failure;

(xi) equipment cooling failure;

(xii) flight instrument failure;

(xiii) partial or total hydraulic failure;

(xiv) failures at the lift devices and flight controls including boosters;

(xv) cargo compartment smoke or fire.

(2) actions according to the approved abnormal and emergency checklist:

(i) engine restart in-flight;

(ii) landing gear emergency extension;

(iii) application of the emergency brake system;

(iv) emergency extension of lift devices;

(v) fuel dumping;

(vi) emergency descent.

Special requirements for extension of a type rating for instrument approaches down to decision heights of less than 200 ft (60 m):

(1) airborne and ground equipment:

(i) technical requirements;

(ii) operational requirements;

(iii) operational reliability;

(iv) fail operational;

(v) fail passive;

(vi) equipment reliability;

(vii) operating procedures;

(viii) preparatory measures;

(ix) operational downgrading;

(x) communications.

(2) procedures and limitations:

(i) operational procedures;

(ii) crew coordination.

Special requirements for 'glass cockpit' aeroplanes with EFIS

Additional learning objectives:

(1) general rules of aeroplanes computer hardware and software design;

(2) logic of all crew information and alerting systems and their limitations;

(3) interaction of the different aeroplane computer systems, their limitations, the possibilities of computer fault recognition and the actions to be performed on computer failures;

(4) normal procedures including all crew coordination duties;

(5) aeroplane operation with different computer degradations (basic flying).

Flight management systems.

II. SE and ME Helicopters

(a) Detailed listing for helicopters structure, transmissions, rotors and equipment, normal and abnormal operation of systems:

(1) dimensions.

(2) engine including aux. power unit, rotor and transmissions; if an initial type rating for a turbine engine helicopter is applied for, the applicant should have received turbine engine instruction:

(i) type of engine or engines;

(ii) in general, the function of the following systems or components:

(A) engine;

(B) auxiliary power unit;

(C) oil system;

(D) fuel system;

(E) ignition system;

(F) starting system;

(G) fire warning and extinguishing system;

(H) generators and generator drive;

(I) power indication;

(J) water or methanol injection.

(iii) engine controls (including starter), engine instruments and indications in the cockpit, their function and interrelation and interpretation;

(iv) engine operation, including APU, during engine start and engine malfunctions, procedures for normal operation in the correct sequence;

(v) transmission system:

(A) lubrication;

(B) generators and generator drives;

(C) freewheeling units;

(D) hydraulic drives;

(E) indication and warning systems.

(vi) type of rotor systems: indication and warning systems.

(3) fuel system:

(i) location of the fuel tanks, fuel pumps, fuel lines to the engines tank capacities, valves and measuring;

(ii) the following systems:

(A) filtering;

(B) fuelling and defuelling heatings;

(C) dumping;

(D) transferring;

(E) venting.

(iii) in the cockpit: the monitors and indicators of the fuel system, quantity and flow indication, interpretation;

(iv) fuel procedures distribution into the various tanks fuel supply and fuel dumping.

(4) air conditioning:

(i) components of the system and protection devices;

(ii) cockpit monitors and indicators;

Note: interpretation about the operational condition: normal operation of the system during start, cruise approach and landing, air conditioning airflow and temperature control.

(5) ice and rain protection, windshield wipers and rain repellent:

(i) ice protected components of the helicopter, including engines and rotor systems, heat sources, controls and indications;

(ii) operation of the anti-icing or de-icing system during take-off, climb, cruise and descent, conditions requiring the use of the protection systems;

(iii) controls and indications of the windshield wipers and rain repellent system operation.

(6) hydraulic system:

(i) components of the hydraulic system(s), quantities and system pressure, hydraulically actuated components associated to the respective hydraulic system;

(ii) controls, monitors and indicators in the cockpit, function and interrelation and interpretation of indications.

(7) landing gear, skids fixed and floats:

(i) main components of the:

(A) main landing gear;

(B) nose gear;

(C) tail gear;

(D) gear steering;

(E) wheel brake system.

(ii) gear retraction and extension;

(iii) required tyre pressure, or location of the relevant placard;

(iv) controls and indicators including warning indicators in the cockpit in relation to the retraction or extension condition of the landing gear;

(v) components of the emergency extension system.

(8) flight controls, stab- and autopilot systems: controls, monitors and indicators including warning indicators of the systems, interrelation and dependencies.

(9) electrical power supply:

(i) number, power, voltage, frequency and if applicable phase and location of the main power system (AC or DC) auxiliary power system location and external power system;

(ii) location of the controls, monitors and indicators in the cockpit;

(iii) main and back-up power sources flight instruments, communication and navigation systems, main and back-up power sources;

(iv) location of vital circuit breakers;

(v) generator operation and monitoring procedures of the electrical power supply.

(10) flight instruments, communication, radar and navigation equipment, autoflight and flight data recorders:

(i) antennas;

(ii) controls and instruments of the following equipment in the cockpit:

(A) flight instruments (for example air speed indicator, pitot static system, compass system, flight director);

(B) flight management systems;

(C) radar equipment (for example weather radar, transponder);

(D) communication and navigation system (for example HF, VHF, ADF, VOR/DME, ILS, marker beacon) and area navigation systems;

(E) stabilisation and autopilot system;

(F) flight data recorder, cockpit voice recorder, data-link communication recording function and radio altimeter;

(G) collision avoidance system;

(H) TAWS;

(I) HUMS.

(11) cockpit, cabin and cargo compartment:

(i) operation of the exterior, cockpit, cabin and cargo compartment lighting and the emergency lighting;

(ii) operation of the cabin doors and emergency exits.

(12) emergency equipment:

(i) operation and correct application of the following mobile emergency equipment in the helicopter:

(A) portable fire extinguisher;

(B) first-aid kits;

(C) portable oxygen equipment;

(D) emergency ropes;

(E) life-jacket;

(F) life rafts;

(G) emergency transmitters;

(H) crash axes;

(I) megaphones;

(J) emergency signals;

(K) torches.

(ii) operation and correct application of the fixed emergency equipment in the helicopter: emergency floats.

(b) Limitations:

(1) general limitations, according to the helicopter flight manual;

(2) minimum equipment list.

(c) Performance, flight planning and monitoring:

(1) performance calculation about speeds, gradients, masses in all conditions for take- off, en-route, approach and landing:

(i) take-off:

(A) hover performance in and out of ground effect;

(B) all approved profiles, cat A and B;

(C) HV diagram;

(D) take-off and rejected take-off distance;

(E) take-off decision point (TDP) or (DPATO);

(F) calculation of first and second segment distances;

(G) climb performance.

(ii) en-route:

(A) air speed indicator correction;

(B) service ceiling;

(C) optimum or economic cruising altitude;

(D) max endurance;

(E) max range;

(F) cruise climb performance.

(iii) landing:

(A) hovering in and out of ground effect;

(B) landing distance;

(C) landing decision point (LDP) or (DPBL).

(iv) knowledge or calculation of: V_{lo}, V_{le}, V_{mo}, V_x, V_y, V_{toss}, V_{ne}, V_{max} range, V_{mini}.

(2) flight planning for normal and abnormal conditions:

(i) optimum or maximum flight level;

(ii) minimum required flight altitude;

(iii) drift down procedure after an engine failure during cruise flight;

(iv) power setting of the engines during climb, cruise and holding under various circumstances as well as at the most economic cruising flight level;

(v) optimum and maximum flight level and power setting after an engine failure.

(3) effect of optional equipment on performance.

(d) Load, balance and servicing:

(1) load and balance:

(i) load and trim sheet on the maximum masses for take-off and landing;

(ii) centre of gravity limits;

(iii) influence of the fuel consumption on the centre of gravity;

(iv) lashing points, load clamping, max ground load.

(2) servicing on the ground, servicing connections for:

(i) fuel;

(ii) oil, etc.;

(iii) and safety regulations for servicing.

(e) Emergency procedures.

(f) Special requirements for extension of a type rating for instrument approaches down to a decision height of less than 200 ft (60 m):

(1) airborne and ground equipment:

(i) technical requirements;

(ii) operational requirements;

(iii) operational reliability;

(iv) fail operational;

(v) fail passive;

(vi) equipment reliability;

(vii) operating procedures;

(viii) preparatory measures;

(ix) operational downgrading;

(x) communication.

(2) procedures and limitations:

(i) operational procedures;

(ii) crew co-ordination.

(g) Special requirements for helicopters with EFIS.

(h) Optional equipment.

III. Airships

(a) Detailed listing for airship structure and equipment, normal operation of systems and malfunctions:

(1) dimensions;

(2) structure and envelope:

(i) internal structure;

(ii) envelope;

(iii) pressure system;

(iv) gondola;

(v) empennage.

(3) flight controls;

(4) systems:

(i) hydraulic;

(ii) pneumatic.

(5) landing gear;

(6) fuel system;

(7) fire warning and extinguishing system;

(8) emergency equipment;

(9) electrical systems;

(10) avionics, radio navigation and communication equipment;

(11) instrumentation;

(12) engines and propellers;

(13) heating, ventilation and air-condition;

(14) operational procedures during start, cruise, approach and landing:

(i) normal operations;

(ii) abnormal operations.

(b) Limitations:

(1) general limitations:

(i) certification of the airship, category of operation, noise certification and maximum and minimum performance data for all flight profiles, conditions and aircraft systems;

(ii) speeds;

(iii) altitudes.

(2) engine limitations;

(3) systems limitations;

(4) minimum equipment list.

(c) Performance and flight planning:

(1) performance calculation;

(2) flight planning.

(d) Load and balance and servicing:

(1) load and balance;

(2) servicing.

(e) Emergency procedures:

(1) recognition of emergency situations;

(2) actions according to the approved abnormal and emergency checklist.

AMC2 FCL.725(a) Requirements for the issue of class and type ratings

Training course

Flight instruction for type ratings: helicopters

(a) The amount of flight instruction depends on:

(i) complexity of the helicopter type, handling characteristics, level of technology;

(ii) category of helicopter (SEP or SE turbine helicopter, ME turbine and MP helicopter);

(iii) previous experience of the applicant;

(iv) the availability of FSTDs.

(b) FSTDs

The level of qualification and the complexity of the type will determine the amount of practical training that may be accomplished in FSTDs, including completion of the skill test. Before undertaking the skill test, a student should demonstrate competency in the skill test items during the practical training.

(c) Initial issue

The flight instruction (excluding skill test) should comprise:

Helicopter types	In helicopter	In helicopter and FSTD associated training Credits
SEP (H)	5 hrs	Using FFS C/D: At least 2 hrs helicopter and at least 6 hrs total Using FTD 2/3: At least 4 hrs helicopter and at least 6 hrs total
SET(H) under 3175 kg MTOM	5 hrs	Using FFS C/D: At least 2 hrs helicopter and at least 6 hrs total Using FTD 2/3: At least 4 hrs helicopter and at least 6 hrs total

Helicopter types	In helicopter	In helicopter and FSTD associated training Credits
SET(H) at or over 3175 kg MTOM	8 hrs	Using FFS C/D: At least 2 hrs helicopter and at least 10 hrs total Using FTD 2/3: At least 4 hrs helicopter and at least 10 hrs total
SPH MET (H) CS and FAR 27 and 29	8 hrs	Using FFS C/D: At least 2 hrs helicopter and at least 10 hrs total Using FTD 2/3: At least 4 hrs helicopter and at least 10 hrs total
MPH	10 hrs	Using FFS C/D: At least 2 hrs helicopter, and at least 12 hrs total Using FTD 2/3: At least 4 hrs helicopter, and at least 12 hrs total

(d) Additional types

The flight instruction (excluding skill test) should comprise:

Helicopter types	In helicopter	In helicopter and FSTD associated training Credits
SEP(H) to SEP(H) within AMC1 FCL.740.H (a)(3)	2 hrs	Using FFS C/D: At least 1 hr helicopter and at least 3 hrs total
		Using FTD 2/3: At least 1 hr helicopter and at least 4 hrs total
SEP(H) to SEP(H) not included in AMC1 FCL.740.H (a)(3)	5 hrs	Using FFS C/D: At least 1 hr helicopter and at least 6 hrs total Using FTD 2/3: At least 2 hr helicopter and at least 7 hrs total
SET(H) to SET(H)	2 hrs	Using FFS C/D: At least 1 hr helicopter and at least 3 hrs total Using FTD 2/3: At least 1 hr helicopter and at least 4 hrs total
SE difference training	1 hr	N/A
MET(H) to MET(H)	3 hrs	Using FFS C/D: At least 1 hr helicopter and at least 4 hrs total Using FTD 2/3: At least 2 hrs helicopter and at least 5 hrs total
ME difference training	1 hrs	N/A
MPH to MPH	5 hrs	Using FFS C/D: At least 1 hr helicopter and at least 6 hrs total Using FTD 2/3: At least 2 hrs helicopter and at least 7 hrs total
Extend privileges on the same type rating from SPH to MPH (except for initial MP issue), or from MPH to SPH	2 hrs	Using FFS C/D: At least 1 hr helicopter and at least 3 hrs total

(e) Holders of an IR(H) wishing to extend the IR(H) to further types should have additionally 2 hours flight training on type by sole reference to instruments according to IFR which may be conducted in an FFS C/D or FTD 2/3. Holders of an SE IR(H) wishing to extend the IR privileges to an ME IR(H) for the first time should complete at least 5 hours training.

AMC1 FCL.740(b)(1) Validity and renewal of class and type ratings

Renewal of class and type ratings: refresher training

(a) Paragraph (b)(1) of FCL.740 determines that if a class or type rating has lapsed, the applicant shall take refresher training at an ATO. The refresher training should include theoretical and practical training. The objective of the training is to reach the level of proficiency necessary to safely operate the relevant type or class of aircraft. The amount of refresher training needed should be determined on a case-by-case basis by the ATO, taking into account the following factors:

(1) the experience of the applicant. To determine this, the ATO should evaluate the pilot's log book, and, if necessary, conduct a test in an FSTD;

(2) the complexity of the aircraft;

(3) the amount of time lapsed since the expiry of the validity period of the rating. The amount of training needed to reach the desired level of proficiency should increase with the time lapsed. In some cases, after evaluating the pilot, and when the time lapsed is very limited (less than 3 months), the ATO may even determine that no further refresher training is necessary. When determining the needs of the pilot, the following items can be taken into consideration:

(i) expiry shorter than 3 months: no supplementary requirements;

(ii) expiry longer than 3 months but shorter than 1 year: a minimum of two training sessions;

(iii) expiry longer than 1 year but shorter than 3 years: a minimum of three training sessions in which the most important malfunctions in the available systems are covered;

(iv) expiry longer than 3 years: the applicant should again undergo the training required for the initial issue of the rating or, in case of helicopter, the training required for the 'additional type issue', according to other valid ratings held.

(b) Once the ATO has determined the needs of the applicant, it should develop an individual training programme that should be based on the initial training for the issue of the rating and focus on the aspects where the applicant has shown the greatest needs.

(c) After successful completion of the training, the ATO should give a certificate, or other documental evidence that the training has been successfully achieved to the applicant, to be submitted to the Kuwait DGCA when applying for the renewal. The certificate or documental evidence needs to contain a description of the training programme.

AMC1 FCL.720.A(b)(2)(i) Experience requirements and prerequisites for the issue of class or type ratings - aeroplanes

Additional theoretical knowledge for a class or type rating for high performance single pilot aeroplanes

A number of aeroplanes certificated for SP operation have similar performances, systems and navigation capabilities to those more usually associated with MP types of aeroplanes, 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 PIC of such aeroplanes. The additional theoretical knowledge required to operate such aeroplanes safely is obtained by completion of a course at an ATO.

The aim of the theoretical knowledge course is to provide the applicant with sufficient knowledge of those aspects of the operation of aeroplanes capable of operating at high speeds and altitudes, and the aircraft systems necessary for such operation.

Course syllabus

The course will be divided in a VFR and an IFR part, and should cover at least the following items of the aeroplane syllabus to the ATPL(A) level:

For VFR operation

Subject Ref:	Syllabus Content
021 00 00 00	**AIRCRAFT GENERAL KNOWLEGDE: AIRFRAME AND SYSTEMS, ELECTRICS, POWERPLANT AND EMERGENCY EQUIPMENT**
021 02 02 01 to 021 02 02 03	Alternating current: general Generators AC power distribution
021 01 08 03	Pressurisation (Air driven systems - piston engines)
021 01 09 04	Pressurisation (Air driven systems - turbojet and turbo propeller)
021 03 01 06 021 03 01 07 021 03 01 08 021 03 01 09	Engine performance - piston engines Power augmentation (turbo or supercharging) Fuel Mixture
021 03 02 00 to 021 03 04 09	Turbine engines
021 04 05 00	Aircraft oxygen equipment
032 03 00 00	**Performance class B: ME aeroplanes**
032 03 01 00 to 032 03 04 01	Performance of ME aeroplanes not certificated under CS and FAR 25: entire subject
040 00 00 00	**HUMAN PERFORMANCE**
040 02 01 00 to	Basic human physiology and
040 02 01 03	High altitude environment
050 00 00 00	**METEOROLOGY**
050 02 07 00 to	Jet streams

Subject Ref:	Syllabus Content
050 02 08 01	CAT Standing waves
050 09 01 00 to 050 09 04 05	Flight hazards Icing and turbulence Thunderstorms
062 02 00 00	**Basic radar principles**
062 02 01 00 to 062 02 05 00	Basic radar principles Airborne radar SSR
081 00 00 00	**PRINCIPLES OF FLIGHT: AEROPLANES**
081 02 01 00 to 081 02 03 02	Transonic aerodynamics: entire subject Mach number or shockwaves buffet margin or aerodynamic ceiling

For IFR operations:

Subject Ref.:	Syllabus Content
010 00 00 00	**AIR LAW**
010 06 07 00	Simultaneous Operation on parallel or near-parallel instrument Runways
010 06 08 00	Secondary surveillance radar (transponder) operating procedures
010 09 08 02	Radio altimeter operating areas
022 00 00 00	**AIRCRAFT GENERAL KNOWLEDGE - INSTRUMENTATION**
022 02 02 02	Temperature measurement - Design and operation
022 03 04 00	Flux valve
022 12 00 00	**ALERTING SYSTEMS, PROXIMITY SYSTEMS**
022 12 07 00	Altitude alert system
022 12 08 00	Radio-altimeter
022 12 10 00	ACAS/TCAS principles and operation
022 13 03 01	Electronic Flight Instrument System (EFIS) — Design, operation
050 00 00 00	**METEOROLOGY**
050 02 06 03	Clear Air turbulence (CAT) - Description, cause and location

Subject Ref:	Syllabus Content
050 10 02 03	Upper air charts
062 00 00 00	**RADIO NAVIGATION**
062 02 05 04	ILS — Errors and accuracy
062 02 06 00	MLS
062 02 06 01 to 062 02 06 04	Principles Presentation and Interpretation, Coverage and range Error and accuracy

Demonstration of acquisition of this knowledge is undertaken by passing an examination set by ATO. A successful pass of this examination results in the issue of a certificate indicating that the course and examination have been completed.

The certificate represents a 'once only' qualification and satisfies the requirement for the addition of all future high performance aeroplanes to the holder's licence. The certificate is valid indefinitely and is to be submitted with the application for the first HPA type or class rating.

A pass in any theoretical knowledge subjects as part of the HPA course will not be credited against meeting future theoretical examination requirements for issue of a CPL(A), IR(A) or ATPL(A).

AMC2 FCL.720.A(b)(2)(i) Experience requirements and prerequisites for the issue of class or type ratings - aeroplanes

Additional theoretical knowledge for a class or type rating for high performance SP aeroplanes

An applicant for an additional class or type rating for a single-pilot aeroplane classified as a high performance aeroplane (HPA), who:

(a) has held a single-pilot HPA class or type rating prior to the application of Part FCL; and

(1) has completed a competency-based modular IR(A) course according to Appendix 6 Aa or EIR course according to FCL.825; and

(2) does not fulfil the requirements of FCL.720.A (b)(2)(ii) or (iii);

should pass the theoretical knowledge instruction and examination for the VFR and IFR parts of the course required in accordance with FCL.720.A.(b)(2)(i).'

GM1 FCL.720.PL Experience requirements and prerequisites for the issue of type ratings – powered-lift aircraft

The endorsement of a powered-lift type rating to an aeroplane or helicopter licence does not confer upon its holder the privileges to fly helicopters or aeroplanes, respectively.

AMC1 FCL.725.A(b) Theoretical knowledge and flight instruction for the issue of class and type ratings - aeroplanes

Class rating sea

The theoretical knowledge instruction should be conducted by an instructor having appropriate experience of class rating sea**.**

Depending on the equipment and systems installed, the instruction should include, but not be limited to, the following content:

(1) theoretical knowledge:

(i) the aim of the training is to teach:

(A) the importance of preparation for flight and the safe planning taking into consideration all the factors for manoeuvring the aircraft on the wind, tidal currents, high and low water times and water movements at sea, river estuaries and lakes In addition, icing conditions, ice covered water and broken ice flows;

(B) the techniques about the most critical moments at take-off, landing, taxiing and mooring the aircraft;

(C) the construction methods and characteristics of floats and water rudders and the importance of checking for leaks in the floats;

(D) the necessary requirements for the compliance of the rules for the avoidance of collisions at sea, in regard to sea charts, buoys and lights and horns.

(ii) after completing the training, the student should be able to:

(A) describe the factors that have significance for planning and decision about initiation of seaplane flying and alternative measures for completion of flight;

(B) describe how the water level is affected by air pressure, wind, tide, regularisations and the flight safety depending on changes in the water level;

(C) describe the origin of different ice conditions in water areas;

(D) interpret nautical charts and maps about depths and shoals and risk for water currents, shifts of the wind, turbulence;

(E) decide what required equipment to bring during seaplane flying according to the operational requirements;

(F) describe the origin and extension of water waves, swells and water currents and their effect on the aeroplane;

(G) describe how water and air forces effect the aeroplane on water;

(H) describe the effect of water resistance on the aeroplanes' performance on glassy water and during different wave conditions;

(I) describe the consequences of taxiing with too high engine RPM;

(J) describe the effect of pressure and temperature on performance at take-off and climb from lakes located at higher altitude;

(K) describe the effect of wind, turbulence, and other meteorological conditions of special importance for flight over lakes, islands in mountain areas and other broken ground;

(L) describe the function of the water rudder and its handling, including the effect of lowered water rudder at take-off and landing;

(M) describe the parts of the float installation and their function;

(N) describe the effect of the floats on the aeroplanes' aerodynamics and performance in water and in air;

(O) describe the consequences of water in the floats and fouling of float bottoms;

(P) describe aviation requirements that apply specifically for the conduct of aircraft activity on water;

(Q) describe requirements about animal, nature and environment protection of significance for flight by seaplane, including flight in national parks;

(R) describe the meaning of navigation buoys;

(S) describe the organisation and working methods of the Sea Rescue Service;

(T) describe the requirements in ICAO Annex 2 as set out in paragraph 3.2.6 'Water operation', including relevant parts of the Convention on the International Regulations for Preventing Collisions at Sea.

(2) practical training:

(i) the aim of the practical training is to learn:

(A) the skills in manoeuvring aeroplanes on water and in mooring the aeroplane;

(B) the skills required for the reconnaissance of landing and mooring areas from the air, including the take-off area;

(C) the skills for assessing the effects of different water depths, shoals, wind, height of waves and swell;

(D) the skills for flying with floats about their effect on performance and flight characteristics;

(E) the skills for flying in broken ground during different wind and turbulence conditions;

(F) the skills for take-off and landing on glassy water, different ° of swell and water current conditions.

(ii) after the training, the student should be able to:

(A) handle the equipment that shall be brought during seaplane flying;

(B) perform pre-flight daily inspection on aeroplane, float installation and special seaplane equipment, including emptying of floats;

(C) sail, taxi and turn the aeroplane at swell with correct handling of the water rudder;

(D) taxi on the step and perform turns;

(E) establish the wind direction with the aeroplane;

(F) take necessary actions if loss of steering ability and person falling overboard;

(G) make land and moor aeroplane at bridge, buoy and beach with the use of appropriate knots to secure the aircraft;

(H) maintain given rate of descent by means of variometer only;

(I) perform take-off and landing on glassy water with and without outer references;

(J) perform take-off and landing under swell;

(K) perform power-off landing;

(L) from the air, reconnaissance of landing, mooring and take-off areas, observing;

(M) wind direction and strength during landing and take-off;

(N) surrounding terrain;

(O) overhead wires and other obstacles above and under water;

(P) congested areas;

(Q) determine wind direction and assess wind strength from water level and when airborne;

(R) state, for the aeroplane type in question;

(a) maximum wave height allowed;

(b) maximum number of ERPM allowed during taxi;

(L) describe how flying with floats affects the performance and flight characteristics of the aeroplane;

(M) take corrective action at critical moments due to wind shear and turbulence;

(N) navigate on the water with reference to buoys markers, obstacles and other traffic on the water.

For the initial issue of class rating sea for SP, SE and ME aeroplanes, the number of multi-choice questions in the written or computer-based examination should at least

comprise thirty questions, and may be conducted by the training organisation. The pass mark should be 75% and may be conducted by the training organisation.

GM1 FCL.725(e) Requirements for the issue of class and type ratings

The hours gained during the instruction flights for category 1 or 2 flight tests are not considered as flight tests related to development, certification or production.

AMC1 FCL.735.A; FCL.735.H; FCL.735.As Multi-Crew Cooperation Course

(a) Competency is a combination of knowledge, skills and attitudes required to perform a task to the prescribed standard.

(1) The objectives of MCC training are to develop the technical and non-technical components of the knowledge, skills and attitudes required to operate a multi-crew aircraft.

(2) Training should comprise both theoretical and practical elements and be designed to achieve the following competencies:

Competency	Performance indicators	Knowledge	Practical exercises
Communication	(a) Know what, how much and who to communicate to; (b) Ensure the recipient is ready and able to receive the information; (c) Pass messages and information clearly, accurately, timely and adequately; (d) Check if the other person has the correct understanding when passing important information; (e) Listen actively, patiently and demonstrate understanding when receiving information; (f) Ask relevant and effective questions, and offer suggestions; (g) Use appropriate body language, eye contact and tone; (h) Open and receptive to other people's view.	(a) Human Factors, TEM and CRM; (b) Application of TEM and CRM principles to training.	In a commercial air transport environment, apply multi-crew procedures, including principles of TEM and CRM to the following: (a) Pre-flight preparation: (1) FMS initialisation; (2) radio and navigation equipment preparation; (3) flight documentation; (4) Computation of take-off performance data. (b) Take-off and climb: (1) before take-off checks; (2) normal take-offs; (3) rejected take-offs; (4) take-offs with abnormal and emergency situations included. (c) Cruise: emergency descent. (d) Descent and approach: (1) instrument flight procedures; (2) holding; (3) precision approach using raw data;
Leadership and team working	(a) Friendly, enthusiastic, motivating and considerate of others; (b) Use initiative, give direction and take responsibility when required; (c) Open and honest about thoughts, concerns and intentions; (d) Give and receive criticism and praise well, and admit mistakes; (e) Confidently do and say what is important to him or her; (f) Demonstrate respect and tolerance towards other people; (g) Involve others in planning and share activities fairly.		

Situation awareness	(a) Aware of what the aircraft and its systems are doing; (b) Aware of where the aircraft is and its environment; (c) Keep track of time and fuel; (d) Aware of the condition of people involved in the operation including passengers; (e) Recognise what is likely to happen, plan and stay ahead of the game; (f) Develop what-if scenarios and make pre-decisions; (g) Identify threats to the safety of the aircraft and of the people.		(4) precision approach using flight director; (5) precision approach using autopilot; (6) one-engine-inoperative approach; (7) non-precision and circling approaches; (8) computation of approach and landing data; (9) all engines go-around; (10) go-around with one engine inoperative; (11) wind shear during approach. (e) landing: transition from instrument to visual flight on reaching decision altitude or height or minimum descent altitude or height; (f) after landing and post flight procedures; (g) selected emergency and abnormal procedures.
Workload management	(a) Calm, relaxed, careful and not impulsive; (b) Prepare, prioritise and schedule tasks effectively; (c) Use time efficiently when carrying out tasks; (d) Offer and accept assistance, delegate when necessary and ask for help early; (e) Review and monitor and cross-check actions conscientiously; (f) Follow procedures appropriately and consistently; (g) Concentrate on one thing at a time, ensure tasks are completed and does not become distracted; (h) Carry out instructions as directed.		
Problem solving and decision making	(a) Identify and verify why things have gone wrong and do not jump to conclusions or make assumptions; (b) Seek accurate and adequate information from appropriate resources; (c) Persevere in working through a problem;		
	(d) Use and agree an appropriate decision making process;		

	(e) Agree essential and desirable criteria and prioritises; (f) Consider as many options as practicable; (g) Make decisions when they need to, reviews and changes if required; (h) Consider risks but do not take unnecessary risks.		
Monitoring and cross- checking	(a) Monitor and cross-checks all actions; (b) Monitor aircraft trajectory in critical flight phases; (c) Take appropriate actions in response to deviations from the flight path.	(a) SOPs; (b) Aircraft systems; (c) Undesired aircraft states.	
Task sharing	(a) Apply SOPs in both PF and PNF roles; (b) Makes and responds to standard callouts.	(a) PF and PNF roles; (b) SOPs.	
Use of checklists	Utilise checklists appropriately according to SOPs.	(a) SOPs; (b) Checklist philosophy.	
Briefings	Prepare and deliver appropriate briefings.	(a) SOPs; (b) Interpretation of FMS data and in-flight documentation.	
Flight management	(a) Maintain a constant awareness of the aircraft automation state; (b) Manage automation to achieve optimum trajectory and minimum workload; (c) Take effective recovery actions from automation anomalies; (d) Manage aircraft navigation, terrain clearance; (e) Manage aircraft fuel state and take appropriate actions.	(a) Understanding of aircraft performance and configuration; (b) Systems; (c) SOPs; (d) Interpretation of FMS data and in-flight documentation; (e) Minimum terrain clearance; (f) Fuel management IFR and VFR regulation.	

FMS use	Programme, manage and monitor FMS in accordance with SOPs.	(a) Systems (FMS); (b) SOPs; (c) Automation.	
Systems normal operations	Perform and monitor normal systems operation in accordance with SOPs.	(a) Systems; (b) SOPs.	
Systems abnormal and emergency operations	(a) Perform and monitor abnormal systems operation in accordance with SOPs; (b) Utilise electronic and paper abnormal checklists in accordance with SOPs.	(a) Systems; (b) SOPs; (c) Emergency and abnormal procedures and checklists; (d) Recall items.	
Environment, weather and ATC	(a) Communicate effectively with ATC; (b) Avoid misunderstandings by requesting clarification; (c) Adhere to ATC instructions; (d) Construct a mental model of the local ATC and weather environment.	(a) Systems; (b) SOPs; (c) ATC environment and phraseology; (d) Procedures for hazardous weather conditions.	

AMC2 FCL.735.A Multi-crew cooperation (MCC) training course – aeroplanes

ENHANCED MCC TRAINING TO AIRLINE PILOT STANDARDS (APS MCC) COURSE

(a) The APS MCC training course should comprise both theoretical and practical elements and should be designed to achieve the training objectives, as set out in Table 1 below.

Table 1 — Training objectives

Training objectives	Performance indicators	Knowledge	Practical exercises
Monitoring and cross-checking	(a) Monitor and cross-check all actions; (b) Monitor aeroplane trajectory in critical flight phases; (c) Take appropriate actions in response to deviations from the flight path.	(a) SOPs; (b) Aeroplane systems; (c) Undesired aeroplane states.	In a commercial air transport environment, apply multi-crew procedures, including principles of TEM and CRM to the following: (a) Pre-flight preparation: (1) FMS initialisation; (2) radio and navigation equipment preparation; (3) flight documentation; (4) computation of take-off performance data. (b) Take-off and climb: (1) before take-off checks; (2) normal take-offs; (3) rejected take-offs; (4) take-offs with abnormal and emergency situations included. (c) Cruise: emergency descent. (d) Descent and approach: (1) instrument flight procedures; (2) holding; (3) 3D Operations using raw data; (4) 3D Operations using flight director; (5) 3D Operations using autopilot; (6) one-engine-inoperative approach; (7) 2D Operations and circling;
Task sharing	(a) Apply SOPs in both PF and PM roles; (b) Make and respond to standard call-outs.	(a) PF and PM roles; (b) SOPs.	
Use of checklists	Utilise checklists appropriately according to SOPs.	a) SOPs; (b) Checklist philosophy.	
Briefings	Prepare and deliver appropriate briefings.	(a) SOPs; (b) Interpretation of FMS data and in-flight documentation.	
Flight management	(a) Maintain a constant awareness of the aeroplane automation state; (b) Manage automation to achieve optimum trajectory and minimum workload; (c) Take effective recovery actions from automation anomalies; (d) Manage aeroplane navigation, terrain clearance; (e) Manage aeroplane fuel state and take appropriate actions.	(a) Understanding of aeroplane performance and configuration; (b) Systems; (c) SOPs; (d) Interpretation of FMS data and in-flight documentation; (e) Minimum terrain clearance; (f) Fuel management IFR and VFR regulation.	
FMS use	Programme, manage and monitor FMS in accordance with SOPs	(a) Systems (FMS); (b) SOPs; (c) Automation.	

Systems normal operations	Perform and monitor normal systems operation in accordance with SOPs.	(a) Systems; (b) SOPs.	(8) computation of approach and landing data; (9) all engines go-around; (10) go-around with one engine inoperative; (11) wind shear during approach. (e) landing: transition from instrument to visual flight on reaching decision altitude or height or minimum descent altitude or height; (f) after landing and post flight procedures; (g) selected emergency and abnormal procedures.
Systems abnormal and emergency operations	(a) Perform and monitor abnormal systems operation in accordance with SOPs; (b) Utilise electronic and paper abnormal checklists in accordance with SOPs.	(a) Systems; (b) SOPs; (c) Emergency and abnormal procedures and checklists; (d) Recall items.	
Environment, weather and air traffic control (ATC)	a) Communicate effectively with ATC; (b) Avoid misunderstandings by requesting clarification; (c) Adhere to ATC instructions; (d) Construct a mental model of the local ATC and weather environment.	(a) Systems; (b) SOPs; (c) ATC environment and phraseology; (d) Procedures for hazardous weather conditions.	

(b) The APS MCC training course should include advanced swept-wing jet aeroplane training and airline operations scenario training to equip a pilot with the knowledge, skills, and attitudes required to commence initial type rating training to the standards generally required by a commercial air transport (CAT) operator certified pursuant to Regulation (EU) No 965/2012 (the 'Air OPS Regulation').

(c) The APS MCC course should consist of the following:

(1) the content of the MCC training course;

(2) advanced swept-wing jet aeroplane training;

(3) advanced airline operations scenario training; and

(4) a final assessment.

(d) The flight simulation training device (FSTD) time per crew during practical training should be a minimum of 40 hours, or 35 for an integrated airline transport pilot licence (ATPL) holders, as set out in Table 2 below.

Table 2 — Minimum hours

Training element	Minimum FSTD time per crew
MCC TRAINING	20 hours/15 hours
ADVANCED SWEPT-WING JET AEROPLANE TRAINING	12 hours
ADVANCED AIRLINE OPERATIONS SCENARIO TRAINING	6 hours
FINAL ASSESSMENT	2 hours

The training elements may be ordered, split and combined, as determined by the approved training organisation (ATO)'s course design.

(e) The ATO should provide generic stand-alone or CAT-operator-specific APS MCC training, advanced swept-wing jet aeroplane training and advanced airline operations scenario training. In the case of generic stand-alone training, the ATO should establish appropriate documentation and manuals representative of a CAT operator, such as manuals for aeroplane original-equipment manufacturers (OEMs), standard operating procedures (SOPs), flight documentation, as well as reporting and documentation for management systems.

FSTDs

(f) The practical training in the APS MCC training course should be based on a multi-pilot, multi-engine aeroplane type capable of carrying at least 50 passengers or equivalent mass. The FSTD used should be type-specific and equipped with a visual system that provides at least 180° horizontal and 40° vertical field of view. However, an FNPT II MCC that has a similar visual cueing system to the above or is approved for MCC pursuant to FCL.735.A may also be acceptable provided that the device is representative of the same class of multi-pilot, multi-engine aeroplane specified in this paragraph in terms of passenger load, mass and performance, and equipped with equivalent aeroplane systems and avionics functionality.

(g) In the case of advanced swept-wing jet aeroplane practical training, an FSTD representing a swept-wing multi-engine jet aeroplane should be used.

INSTRUCTOR QUALIFICATION

(h) The minimum qualification level of an instructor to deliver the training course should be an MCCI(A). The ATO should ensure that:

(1) all the instructors, before delivering the training course content, have received training on the application of core competencies as well as competency-based training; and

(2) before the MCCI(A) delivers the advanced swept-wing jet handling or airline operations scenario training elements, they have satisfactorily completed relevant specific handling, systems and technical instructor training under the supervision of an SFI or TRI with the privilege to instruct for multi-pilot aeroplanes.

(i) The final assessment should be completed by an instructor nominated by the head of training (HT) for this purpose.

COURSE DESIGN AND CORE COMPETENCIES

(j) The course should be designed using instructional systems design (ISD) methodology.

(k) Progress should be monitored throughout the course in accordance with the course design.

(l) A final progress assessment should be conducted at the end of the practical training.

PROGRESS ASSESSMENTS AND COURSE COMPLETION CERTIFICATE

(m) Practical training and progress assessments should be conducted to ensure that the student pilot has demonstrated the required level of competency (see Tables 1, 2, 3, 4 and 5 of this AMC).

(n) During progress assessments, the student's knowledge, skills and attitudes in both pilot flying and pilot monitoring roles should be assessed; those assessments should be integrated into the training sessions.

(o) All assessments should be graded. An example of a grading system for the APS MCC is provided in GM3 FCL.735.A.

(p) For the final assessment, the minimum standard for each competency should be at least 'satisfactory'. 'Satisfactory' is defined as demonstrating 75 % or greater of the relevant performance indicators/observable behaviours set out in the table of GM3 FCL.735.A.

(q) A student pilot who has reached a satisfactory or higher standard at the final assessment of the practical training should be awarded the APS MCC course completion certificate pursuant to AMC2 FCL.735.A.

(r) Alternatively, a student pilot who completes the APS MCC course but does not achieve the APS MCC standard should be awarded the MCC course completion certificate pursuant to AMC1 FCL.735.A; FCL.735.H; FCL.735.As.

APS MCC TRAINING COURSE CONTENT AND PERFORMANCE INDICATORS

(s) The elements of AMC1 FCL.735.A(c) should be enhanced as a result of the additional training in an airline context.

(t) CRM training should be provided to an APS MCC standard.

Table 3 — APS MCC CRM TRAINING CONTENT AND PERFORMANCE INDICATORS

Training	Performance indicators	Knowledge	Practical exercises
CRM training	(a) Display competency in the relevant CRM-related behaviours. (b) Successfully complete the final progress check.	Understand the CRM concepts set out in ORO.FC.115 of Annex III (Part-ORO) to the Air OPS Regulation.	Integrate CRM into all practical exercises of the APS MCC.

(1) The ATO should ensure that the student pilot understands how multi-crew coordination as well as the content and intent of CRM in ORO.FC.115 is applied in an airline context.

(2) In order to impart maximum learning to the student pilot, the ATO should ensure the following:

(i) CRM is integrated into all practical exercises of the APS MCC; and

(ii) Threat-and-error management (TEM) is central to the course instruction; the concepts of threat anticipation, threat recognition, recovery to safe flight, error management, and consequent avoidance of undesired aeroplanes states is emphasised at all times.

Table 4 — ADVANCED APS MCC FLYING TRAINING COURSE CONTENT AND PERFORMANCE INDICATORS			
Training	**Performance indicators**	**Knowledge**	**Practical exercises**
Advanced swept-wing flying training	(a) Understand and apply combinations of thrust and attitude that ensure a stable, safe flight in various aeroplane configurations and altitudes. (b) Manage the (much) wider range of speed and thrust at both low level and high level. (c) Demonstrate good judgement and correct use of lift and drag devices during various phases of the flight. (d) Use displays along with all available aids to stay mentally ahead when piloting all profiles. (e) Understand and recognise the precursors of high-energy approaches. (f) Know angle-of-attack (AoA) versus attitude indications at low level as well as at high level. (g) Practice upset prevention as a priority, and clearly recognise when and how recovery is necessary, by using the required pilot skills to mitigate loss of control in-flight (LOC-I) events.	Elements and components of jet orientation: (a) glass cockpit displays; (b) propulsion; (c) aerodynamics; (d) flight controls; (e) performance; (f) jet flight planning; (g) weight and balance; (h) basic jet flying; (i) pilot techniques for jet flying, advanced-handling-skills development; (j) flight path management; (k) auto flight; (l) high-altitude operations; (m) introduction into prevention and recovery of upsets.	(a) Take-off, approach, landing, go-around. (b) Flight deck management practices. (c) Complex problem-solving techniques. (d) Advanced handling. (e) Manual handling skills (no autopilot, no auto thrust, and where possible, no flight director). (f) Flight at different speeds, including slow flight and altitudes within the normal flight envelope. (g) Steep turns. (h) Aeroplane stability and stall awareness. (i) Upset prevention techniques and approach-to-stall recovery events (appropriate to FSTD limitations and capabilities). (j) High-energy approach prevention. (k) Go-around management of approach and landing configurations.

Table 4 — ADVANCED APS MCC FLYING TRAINING COURSE CONTENT AND PERFORMANCE INDICATORS			
Training	**Performance indicators**	**Knowledge**	**Practical exercises**
Advanced airline operations scenario training	(a) Execute pre-flight preparation in accordance with airline or OEM SOPs. (b) Conduct an effective crew briefing, including cabin crew managers (CCMs). (c) Display good airmanship and TEM skills in assessing aeroplane serviceability, weather planning, fuel planning, and destination facilities. (d) Conduct cockpit preparation and briefings in an effective and accurate manner. (e) Manage and execute engine start, taxi-out and pre-take-off checks safely and in accordance with airline or OEM SOPs. (f) Manage and execute runway line-up, take-off, climb, cruising, descent, approach, landing and taxi-in safely and in accordance with airline or OEM SOPs. (g) During non-normal operations, display good system knowledge, and apply non-normal procedures, communications, TEM, situational awareness (SA), decision-making and aeroplane handling.	(a) Knowledge of systems as set out in this AMC. (b) SOPs. (c) Normal-and non-normal operations' checklists and procedures.	(a) CHECK-IN PROCEDURES. (b) PRE-FLIGHT PREPARATION: (1) weather analysis; (2) flight planning; (3) fuel planning; (4) configuration deviation list (CDL), dispatch deviation procedures guide (DDPG), and minimum equipment list (MEL) analysis; and (5) cabin crew briefing. (c) NORMAL PROCEDURES: cockpit preparation, pushback, engine starting, taxiing, take-off, climb, cruising, descent, landing, shutdown, and disembarkation procedures. (d) ON TIME PERFORMANCE: (1) weather analysis; (2) flight planning; and (3) fuel planning. (e) NON-NORMAL PROCEDURES: (1) as per (c) above, in case of a technical or operational non-normal event; (2) TEM; (3) diversion decision-making; (4) communication; (5) diversion; (6) fuel SA; and (7) passenger and crew care.

Table 5 — ADVANCED APS MCC AIRLINE TRAINING CONTENT AND PERFORMANCE INDICATORS			
Training	**Performance Indicators**	**Knowledge**	**Practical Exercises**
Airline-oriented training	(a) Understand the roles of airline departments. (b) Understand the challenges faced by airline departments. (c) Understand the relationships between airline departments. (d) Understand airline responsibilities. (e) Understand a pilot's responsibilities as a crew member.	Appropriate elements of the applicable Regulation (Regulation (EU) No 1178/2012 (the 'Aircrew Regulation') and the Air OPS Regulation).	The exercise should provide the student pilot with a practical understanding of airline operations. This may be achieved through a visit to an airline or alternative means.

CERTIFICATE OF COMPLETION FORM CERTIFICATE OF COMPLETION OF APS MCC-TRAINING		
Applicant's last name(s):	First name(s):	
Type of licence:	Number:	State:
ME/IR:	**OR**	ME/IR skill test:
Issued on:	passed on:	
Signature of applicant:		

The satisfactory completion of APS MCC training according to requirements is certified below:

TRAINING			
Multi-crew cooperation training to airline pilot standards received during period:			
from:	to:	at:	ATO/operator*
Location and date:		Signature of head of ATO or authorised instructor*:	
Type and number of licence and state of issue:		Name(s) in capital letters of authorised instructor:	

* Delete as appropriate

GM1 FCL.735.A Multi-crew cooperation (MCC) training course – aeroplanes

ENHANCED MCC TRAINING TO AIRLINE PILOT STANDARDS (APS MCC) COURSE

(a) The ATO should be responsible for the initial course design based on the instructional systems design (ISD) methodology, as well as for the integral evaluation and further development of the course.

(b) Technical-knowledge instruction

To maximise the benefit during the training in a flight simulation training device (FSTD), it is essential that the student pilot understands the aeroplane systems. Consequently, the approved training organisation (ATO) should provide sufficient systems training to ensure that student pilots are capable of effective situational awareness (SA) of the aeroplane systems when following normal and non-normal procedures and completing the related checklists. The standard of technical-knowledge training should be limited to this goal unless the course is part of a combined APS MCC/type rating course. ATOs providing APS MCC training in a combined APS MCC/type rating course may provide systems training up to type rating standard.

Aeroplane systems training may be delivered by any means provided that the training ensures knowledge transfer to a standard within the scope of the ATO's APS MCC training course approval. This training may be delivered either through distance learning or instructor-led classroom instruction or a combination thereof. If distance learning is utilised as an element of the course, it should be supplemented by instructor-led training.

Aeroplane systems knowledge at the required level should be confirmed by an assessment determined by the ATO's course design.

(c) Advanced swept-wing jet flying training (see Table 4 of AMC2 FCL.735.A)

The student pilot should develop a flight path management competency, including energy management, as pilot flying (PF), and associated active monitoring skills as pilot monitoring (PM). Aeroplane and airline procedures used during this training should develop the student pilot's understanding of the aeroplane flight envelope and inertia, as well as of the relationship between thrust and attitude. This phase should include an introduction to prevention and recovery of upsets, which builds confidence, skill, and resilience.

(d) Advanced airline operations scenario training (see Table 4 of AMC2 FCL.735.A)

(1) The student pilot should be trained to apply the core competencies to conduct a safe and efficient operation in realistic airline operations scenarios.

(2) The airline-representative scenarios should include normal and non-normal situations.

(3) Operations should be run in real time according to a typical schedule.

(4) The scenarios should be constructed in an airline context in order to emphasise the following:

(i) threat-and-error management (TEM);

(ii) crew resource management (CRM);

(iii) flight path management, including energy management; and

(iv) interaction with internal and external stakeholders in the resolution of scenarios.

Easy Access Rules for Aircrew

(e) Airline-oriented training (see Table 5 of AMC2 FCL.735.A)

The training should provide an understanding of the regulatory framework that an airline must operate in. The student pilot should understand the context and operational environment that applies to airline employees. Subjects should include but are not limited to the following:

(1) regulation of operations and aircrew;

(2) safety management systems (SMSs) with emphasis on the pilot's reporting obligations and 'just culture';

(3) fatigue management and fatigue risk management system (FRMS) with emphasis on the airline's and pilot's obligations;

(4) flight time limitations (FTLs), including crew scheduling and crew control functions;

(5) flight operations planning and flight watch reporting systems;

(6) airline maintenance department and interaction with flight operations;

(7) ground operations and interaction with flight operations; and

(8) in-flight department and interaction with flight operations.

GM2 FCL.735.A Multi-crew cooperation (MCC) training course – aeroplanes

ENHANCED MCC TRAINING TO AIRLINE PILOT STANDARDS (APS MCC) COURSE

The approved training organisation (ATO) should ensure that their course design develops the required core competencies through their training and assessment plan based on the competency framework provided in Table 1 below. An ATO may adapt this framework to include additional competencies and/or performance indicators/observable behaviours

Table 1 — COMPETENCIES

Competency	Description	Performance indicators/observable behaviours
Application of knowledge	Relates and applies relevant knowledge in the operational environment and in scenario settings.	– Demonstrates the acquisition and retention of required aviation knowledge; – Relates knowledge between subject areas; – Applies knowledge to the operational environment; – Correctly identifies threats and errors in a timely manner; – Uses knowledge to create valid options of managing threats, errors, and undesirable aeroplane states; – Mentally resolves basic-mathematics problems relating to operational situations, both under normal circumstances and under pressure; – Shares knowledge with others openly and constructively, as and when appropriate.
Application of regulations and procedures	Identifies and applies appropriate procedures in accordance with published operating	– Identifies where to find the information; – Follows standard operating procedures (SOPs) unless a higher degree of safety dictates an appropriate deviation therefrom;
	instructions and pursuant to applicable regulations.	– Follows all operating instructions in a timely manner; – Correctly operates aeroplane systems and associated equipment; – Monitors the status of aeroplane systems; – Complies with applicable regulations; – Applies relevant procedural knowledge.

Communication	Communicates through appropriate means in normal and non-normal situations.	– Ensures that the recipient is ready and able to receive the information; – Shares appropriate information; – Selects appropriately what, when, how, and with whom to communicate; – Conveys messages clearly, accurately, and concisely; – Confirms that the recipient correctly understands important information; – Listens actively and demonstrates understanding when receiving information; – Asks relevant and effective questions; — Communicates in order to resolve deviations identified through monitoring; – Adheres to standard radiotelephony phraseology and procedures; – Accurately reads, interprets, drafts, and responds to data link messages in English; – Correctly uses and interprets non-verbal communication.
Aeroplane flight path management — automation	Controls the aeroplane flight path through automation.	– Uses appropriate flight management and guidance systems as well as automation, as installed and as appropriate to the conditions; – Monitors and detects deviations from the desired aeroplane trajectory and takes appropriate action; – Manages the flight path to optimise the operational performance; – Maintains the desired flight path during flight using automation, whilst managing other tasks and distractions; – Effectively monitors automation, including engagement and automatic-mode transitions.
Aeroplane flight path management — manual control	Controls the aeroplane flight path through manual flight.	– Uses appropriate flight management and guidance systems and automation, as installed and appropriate to the conditions; – Manually controls the aeroplane using only the relationship between aeroplane attitude, speed and thrust, as well as navigation signals or visual information; – Monitors and detects deviations from the desired aeroplane trajectory and takes appropriate action; – Manages the flight path to optimise the operational performance; – Maintains the desired flight path during manual flight, whilst managing other tasks and distractions; – Effectively monitors flight guidance systems, including engagement and automatic-mode transitions
Leadership and teamwork	Influences others so that they contribute to a shared purpose. Collaborates to accomplish the goals of the team.	– Creates an atmosphere of open communication and encourages team participation; – Displays initiative and gives directions when required; – Admits mistakes and takes responsibility; – Carries out instructions when directed; – Gives and receives feedback constructively; – Applies effective intervention strategies to resolve deviations identified whilst monitoring; – Takes into account cultural differences; – Engages others in planning; – Addresses and resolves conflicts and disagreements in a constructive manner; – Exercises decisive leadership.
Problem-solving and decision-making	Identifies problem precursors and resolves actual problems, using decision-making	– Seeks accurate and appropriate information from appropriate sources; – Identifies and verifies what and why has failed; – Perseveres with resolving problems whilst prioritising safety;

	techniques, in a timely manner.	– Uses appropriate and timely decision-making techniques; – Sets priorities appropriately; – Identifies and considers options, as appropriate; – Monitors, reviews, and adapts decisions, as required; – Identifies, assesses, and manages risks effectively; – Adapts when faced with situations where no guidance or procedure exists.
Situational awareness (SA) and information management	Perceives, comprehends, and manages information, as well as anticipates its effect on the operation.	– Monitors, identifies, and assesses accurately the aeroplane's state and systems; – Monitors, identifies, and assesses accurately the aeroplane's energy state and anticipated flight path; – Monitors, identifies, and assesses accurately the general environment as it may affect the operation; – Validates the accuracy of information and checks for gross errors; – Maintains the awareness of the people involved in or affected by the operation as well as their capacity to perform as expected; – Anticipates what could happen, plans, and stays ahead of the situation; – Develops effective contingency plans based upon potential threats; – Recognises and effectively responds to indications of reduced SA.
Workload management	Maintains available workload capacity through prioritisation and distribution of tasks, using resources.	– Exercises self-control in all situations; – Plans, prioritises, and schedules tasks effectively; – Manages time efficiently when carrying out tasks; – Offers and gives assistance, delegates when necessary; – Seeks and accepts assistance, when necessary; – Monitors, reviews, and cross-checks taken action conscientiously; – Verifies that tasks are completed as expected; – Manages and recovers from interruptions, distractions, variations, and failures effectively, while performing tasks.

GM3 FCL.735.A Multi-crew cooperation (MCC) training course – aeroplanes

EXAMPLE OF AN ENHANCED MCC TRAINING TO AIRLINE PILOT STANDARDS (APS MCC) GRADING SYSTEM

EXAMPLE OF AN APS MCC GRADING SYSTEM					
Competency	**Unsatisfactory**	**Satisfactory**	**Good**	**Very Good**	**Exemplary**
General description of each competency level.	The pilot's performance in this competency was unsatisfactory with a negative effect on safety. The pilot did not demonstrate the majority of the relevant performance indicators.	The pilot's performance in this competency was satisfactory with a slightly positive effect on safety. The pilot demonstrated most of the relevant performance indicators in this competency to at least a satisfactory standard.	The pilot's performance in this competency was effective with a significant contribution to safety. The pilot consistently demonstrated most of the relevant performance indicators in this competency to a good standard.	The pilot's performance in this competency was very effective, which significantly enhanced safety. The pilot regularly demonstrated all of the relevant performance indicators in this competency to a very good standard.	The pilot's performance in this competency was exemplary with an outstanding effect on safety. The pilot always demonstrated all of the relevant performance indicators in this competency to an exemplary standard.
Notes			— Most: 75 % or greater. — Relevant performance indicator: a performance indicator/observable behaviour that is expected to be demonstrated during the assessment		

GM4 FCL.735.A Multi-crew cooperation (MCC) training course – aeroplanes

ENHANCED MCC TRAINING TO AIRLINE PILOT STANDARDS (APS MCC) TRAINING — SPECIFIC ARRANGEMENT

The specific arrangement, pursuant to ORA.GEN.205, between an approved training organisation (ATO) and an operator for the APS MCC course should cover at least the following points:

(1) pre-entry requirements (including screening and selection);
(2) provision of the relevant documentation (operations manuals (OMs) and training manuals);
(3) design of the training programme;
(4) content of the course, including criteria to ensure that the operator's documentation, manuals, standard operating procedures (SOPs), reporting structures, and management system are represented throughout the training course;

(5) training effectiveness;
(6) performance data feedback from the ATO to the operator;
(7) course evaluation and improvement;
(8) alignment of the grading and assessment criteria; and
(9) use of the operator's crew resource management (CRM) content and utilisation of a flight crew CRM trainer, standardised by the operator.

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

AMC1 FCL.745.A Advanced UPRT course – aeroplanes

COURSE OBJECTIVE AND CONTENT

COURSE OBJECTIVE

(a) The objective of the course is for the pilot under training:
(1) to understand how to cope with the physiological and psychological aspects of dynamic upsets in aeroplanes; and
(2) to develop the necessary competence and resilience to be able to apply appropriate recovery techniques during upsets

(b) In order to meet the objective as specified in point (a), the course should:

(1) emphasise physiological and psychological effects of an upset and develop strategies to mitigate those effects;
(2) be delivered in a suitable training aircraft in order to expose trainees to conditions that cannot be replicated in an FSTD; and
(3) employ recovery techniques that are suitable for the aircraft used for training in order to support the training objectives. In order to minimise the risk associated with potential negative transfer of training, the recovery techniques used during the course should be compatible with techniques typically used for transport category aeroplanes.

THEORETICAL KNOWLEDGE

(c) Theoretical knowledge instruction supports the objectives of the course and should include the following:

(1) a review of basic aerodynamics typically applicable to aeroplane upsets in transport category aeroplanes, including case studies of incidents involving potential or actual upsets.
(2) aerodynamics relevant to the aeroplane and exercises used in the practical training, including differences to aerodynamics as referred to in point (1);
(3) possible physiological and psychological effects of an upset, including surprise and startle effect;
(4) strategies to develop resilience and mitigate startle effect; and
(5) memorising the appropriate procedures and techniques for upset recovery.

FLIGHT INSTRUCTION

(d) Flight instruction should include:

(1) exercises to demonstrate:
(i) the relationship between speed, attitude and AoA;
(ii) the effect of g-load on aeroplane performance, including stall events at different attitudes and airspeeds;

(iii) aerodynamic indications of a stall including buffeting, loss of control authority and inability to arrest a descent;
(iv) the physiological effects of different g-loads between -1 and 2.5G; and
(v) surprise and the startle effect;

(2) training in techniques to recover from:
(i) nose high at various bank angles;
(ii) nose low at various bank angles;
(iii) spiral dives;
(iv) stall events; and
(v) incipient spin; and

(3) training to develop resilience and to employ strategies to mitigate the startle effect.

COURSE COMPLETION

(e) The course is considered to have been satisfactorily completed if the trainee is able to successfully:

(1) apply strategies to mitigate psychological and physical effects;
(2) recognise upsets;
(3) apply correct recovery techniques from upset scenarios as specified in point (d)(2).

GM1 FCL.745.A Advanced UPRT course – aeroplanes

UPSET RECOVERY TRAINING EXERCISES

GENERAL

(a) The objective of this GM is to provide instructors with further guidance on the conduct of the various upset recovery exercises, which requires instructor performance beyond that experienced in normal operations.
(b) Instructors should:
(1) ensure that the risk mitigation measures determined by the ATO are strictly adhered to;
(2) continuously assess the performance of the student to ensure that the training objectives of the upset recovery exercises are achieved;
(3) understand that all-attitude/on-aeroplane upset recovery exercises serve primarily as resilience-builder. In other words, the training serves mainly human-factor training objectives and not only flying skills training;
(4) understand the differences between all-attitude UPRT and aerobatics training;
(5) have knowledge and understanding of how:
(i) on-aeroplane and FSTD UPRT complement each other; and
(ii) to ensure that negative transfer of training from small aeroplanes to heavier transport category aeroplanes is avoided. This may be achieved by observing UPRT in an FSTD, especially in a type-specific FFS; and
(6) have knowledge and understanding of the upset prevention theoretical knowledge and flight instruction elements taught during the CPL(A) and ATPL(A) training courses to ensure continuity and consistency in delivering UPRT.

Note: Instructors should be aware that the safety and potential human factor implications of poor upset recovery instructional technique or misleading information are more significant than in any other areas of pilot training.

(c) In order to increase the applicant's resilience related to the handling of aeroplane upsets, the advanced UPRT course needs to include the development of confidence and

competence in recognising and recovering safely from upsets under the presence of the real human factors. Such confidence building is specifically addressed by:

(i) successfully overcoming natural stress response (startle and surprise); and

(ii) performing critically important counter-intuitive actions.

Advanced UPRT therefore considers pitch attitudes, bank angles, AOA/airspeeds, sideslip and g-loads, none of which are normally experienced during routine operations.

(d) Aeroplanes used in this course should be:

(1) appropriately certified and operated by the ATO in a manner that takes into account the effects of repeated training manoeuvres on airframe fatigue life; and

(2) provide sufficient safety margins to cater for student and instructor errors.

(e) This course complements UPRT in FSTDs by providing exposure to psycho-physiological conditions, which cannot be delivered by the motion systems of today's qualified FSTDs. At completion of the course, the student should pilot to be able to:

(1) recognise and confirm the upset-situation;

(2) manage stress response;

(3) apply the correct recovery strategy timely and effectively;

(4) stay within the defined training envelope;

(5) stabilise the flight path after recovery; and

(6) become competent and confident in recovering from upsets.

SPECIFIC EXERCISES

(f) Exercise 1 — Nose HIGH recovery

Exercise 1 Recovery from **Nose HIGH** upsets at various bank angles	
(1) Training objectives	The student pilot should: (i) recognise and confirm the Nose HIGH situation (AOA, attitude, energy, trends); (ii) announce 'Nose High'; and (iii) apply the correct recovery strategy.
(2) Training tasks	The student pilot should: (i) regain situation awareness; (ii) recognise and analyse AOA, pitch, bank, energy state and trends; (iii) note natural and synthetic indications for AOA, attitude, and energy; (iv) manage human factors, stress response (startle and surprise, counter-intuitive actions); (v) take manual control; (vi) identify and apply the Nose HIGH recovery strategy; (vii) correct any out-of-trim condition; (viii) manage nose-down movement; (ix) manage g-load; (x) use the effects of power to assist nose-down movement; (xi) use bank to orient the lift vector as necessary; (xii) stabilise the flight path after recovery using basic pitch/power settings;
(3) Enabling objectives	The student pilot should: (i) decide if Stall Recovery or Nose HIGH recovery is applicable; (ii) perform control inputs deliberately; (iii) use up to full control deflections; (iv) avoid unnecessary low or high loads; (v) use secondary flight controls (trim/power) as necessary to support primary flight control inputs (i.e. nose-down movement);

	(vi) apply control inputs in the correct sequence (see Table 1, Nose-HIGH Recovery Strategy); (vii) apply counter-intuitive actions as necessary: (A) unloading; (B) power-reduction in Nose-HIGH attitude (depending on engine mounting); and (C) using bank to orient the lift vector downwards

Note: Refer to GM1 to Appendix 9, Table 2: Recommended nose-high recovery strategy template.

(g) Exercise 2 — Nose LOW Recovery

Exercise 2 Recovery from **Nose LOW** upsets at various bank angles	
(1) Training objectives	The student pilot should: (i) recognise and confirm the situation (AOA, attitude, energy, trends); (ii) announce 'Nose LOW'; (iii) apply the correct recovery strategy.
(2) Training tasks	The student pilot should: (i) regain situation awareness; (ii) recognise and analyse AOA, pitch, bank, energy state and trends; (iii) note natural and synthetic indications for AOA, attitude and energy; (iv) manage human factors, stress response (startle and surprise, counter-intuitive actions); (v) take manual control; (vi) identify and apply the Nose LOW recovery strategy; (vii) correct out-of-trim condition; (viii) decide if aircraft is stalled; (ix) manage g-load; (x) identify the correct direction to roll; (xi) roll to wings level to orient the lift vector upwards; (xii) manage power and drag; and (xiii) stabilise the flight path after recovery using basic pitch/power settings.
(3) Enabling objectives	The student pilot should: (i) perform control inputs deliberately; (ii) use up to full control deflections; (iii) avoid unnecessary low or high loads; (iv) apply control inputs in the correct sequence (see Table 2, Nose-LOW Recovery Strategy); and (v) apply counter-intuitive actions as necessary: (A) apply Stall Recovery in nose low attitude first if needed; (B) unloading instead of pulling; (C) unloading to increase roll rate; (D) avoid 'rolling-pull'; and (E) accept the priority of rolling to wings level first, before reducing power and before pulling.

Note: Refer to GM1 to Appendix 9, Table 3: Recommended nose-low recovery strategy template.

(h) Exercise 3 — Recovery from spiral dive

Exercise 3 Recovery from **Spiral Dive**	
(1) Training objectives	The student pilot should: (i) recognise the spiral dive as a result of improper nose-up elevator input during a Nose LOW turning situation; and (i) apply the Nose LOW Recovery Strategy.

(2) Training tasks	The student pilot should: (i) maintain/regain situation awareness; (ii) recognise and analyse AOA, pitch, bank, energy state and trends; (iii) manage human factors, stress response (startle and surprise, counter-intuitive actions); (iv) take manual control; (v) identify and apply the Nose LOW recovery strategy; and (vi) stabilise the flight path after recovery using basic pitch/power settings.
(3) Enabling objectives	The student pilot should: (i) perform control inputs deliberately and in the correct sequence; (ii) use up to full control deflections, if required; and (iii) apply counter-intuitive actions as necessary: (A) unloading instead of pulling; (B) unloading to increase roll rate; (C) avoid 'rolling-pull'; and (D) accepting the priority of rolling to wings level first, before reducing power and before pulling

(i) Exercise 4 — Stall Event Recovery

Exercise 4 Recovery from **Stall event**	
(1) Training objectives	The student pilot should: (i) recognise and confirm the situation (AOA, attitude, energy, trends); (ii) announce 'Stall'; (iii) apply the Stall Event Recovery Strategy.
(2) Training tasks	The student pilot should: (i) regain situation awareness; (ii) recognise and analyse AOA, pitch, bank, energy state and trends; (iii) note natural and synthetic indications for high AOA/stall; (iv) manage human factors, stress response (startle and surprise, counter-intuitive actions); (v) recover from: (A) approach to stall (B) full stall, wings level and during turn (C) slipping stall (D) skidding stall (E) accelerated stall (F) secondary stall (vi) take manual control; (vii) identify and apply the Stall Event Recovery Template or the aircraft manufacturer Stall Recovery SOP; (viii) apply nose-down elevator input to reduce AOA; (ix) manage trim; (x) consider power reduction (if engine mounting induces a nose-up effect); (xi) accept altitude loss; (xii) identify the correct direction to roll to wings level; (xiii) manage power and drag; (xiv) manage g-load and energy to avoid secondary stall; and (xv) stabilise the flight path after recovery using basic pitch/power settings.
3) Enabling objectives	The student pilot should: (i) perform control inputs deliberately; (ii) use up to full control deflections; (iii) apply control inputs in the correct sequence (see Table 3, Stall Event Recovery Strategy Template); and (iv) apply counter-intuitive actions as necessary:

	(A) unloading to reduce AOA; (B) unloading before rolling; (C) power reduction if necessary; (D) accepting altitude loss; and (E) waiting for airspeed increase before loading again.

Note: Refer to GM1 to Appendix 9, Table 1: Recommended stall event recovery template

(j) Exercise 5 — Recovery from spin

Exercise 5 Recovery from incipient spin	
(1) Training objectives	The pilot should: (i) recognise and confirm the spin (AOA, yaw, attitude, energy, roll, trends); (ii) apply the OEM Incipient Spin Recovery procedure.
(2) Training tasks	The pilot should: (i) be aware of the aircraft response to all possible pitch and roll control inputs and to thrust/power changes during (incipient) spin; (ii) maintain/regain situation awareness; (iii) recognise and analyse AOA, attitude, energy, yaw, roll, trends); (iv) note natural and synthetic indications for high AOA, stall, spin; (v) manage human factors, stress response (startle and surprise, counter-intuitive actions); (vi) take manual control; (vii) identify and apply the OEM Incipient Spin Recovery Procedure; (viii) manage AOA, g-load and energy to avoid secondary stall; and (ix) stabilise the flight path after recovery using basic pitch/power settings.
(3) Enabling objectives	The pilot should: (i) perform control inputs deliberately and in the correct sequence; (ii) use up to full control deflections as required by the procedure; (iii) apply counter-intuitive actions as necessary; (iv) avoid unreflected control inputs; and (v) allow time for control inputs to show results.

(k) Assessment of student performance

By collecting evidence from observable behaviours, the instructor will continuously assess whether the student meets the required competency standards under the given conditions.

Pilot competencies and behavioural indicators in the context of the Advanced UPRT Course
(1) Application of procedures (i) Follows the recommended Nose HIGH or Nose LOW recovery strategy or the Stall Event Recovery Template / STALL RECOVERY SOP (ii) Identifies and follows operating instructions in a timely manner (iii) Correctly operates aircraft systems and equipment (iv) Applies relevant procedural knowledge **(2) Communication** (i) Adheres to callouts (ii) Verbalises the essential steps during the recoveries **(3) Aeroplane flight path management — automation** Disconnects autopilot and autothrust/autothrottle before initiating the recovery (to be simulated if the training aeroplane is not fitted with autothrust/autothrottle) **(4) Aeroplane flight path management — manual control** (i) Detects deviations from the desired aircraft trajectory and takes appropriate action (ii) Controls the aircraft using appropriate attitude and power settings (iii) Contains the aircraft within the defined flight envelope **(5) Leadership and teamwork** (i) Understands and agrees with the crew's roles and objectives (ii) Uses initiative and gives directions when required (iii) Admits mistakes and takes responsibility (iv) Communicates relevant concerns and intentions (v) Gives and receives feedback constructively (vi) Projects self-control in all situations **(6) Problem-solving and decision-making** (i) Seeks accurate and adequate information from appropriate sources (ii) Identifies and verifies what and why things have gone wrong (iii) Perseveres in working through the event safely (iv) Sets priorities appropriately **(7) Situation awareness and information management** (i) Identifies and assesses accurately the state of the aircraft and its systems (ii) Identifies and assesses accurately the aircraft's vertical and lateral position, and its anticipated flight path (iii) Anticipates accurately what could happen, plans and stays ahead of the situation (iv) Recognises and effectively responds to indications of reduced situation awareness. **(8) Workload management** (i) Maintains self-control in all situations Manages and recovers from stress response (startle surprise), interruptions, distractions, variations and errors effectively (ii) Reviews, monitors and cross-checks actions conscientiously (iii) Verifies that tasks are completed to the expected outcome (iv) Offers and accepts assistance, delegates when necessary, and asks for help early (v) (v) Manages and recovers from interruptions, distractions, variations and failures effectively

AMC1 FCL.740.H(a)(3) Revalidation of type ratings – helicopters

Only the following SEP helicopter types can be considered for crediting of the proficiency check. Other SEP helicopters (for example the R22 and R44) should not be given credit for.

Agusta-Bell	
SEP	Bell47
Bell Helicopters	
SEP	Bell47
Brantley	
SEP	Brantley B2
Breda Nardi	
SEP	HU269
Enstrom	
SEP	ENF28
Hélicoptères Guimbal	
SEP	Cabri G2
Hiller	
SEP	UH12
Hughes or Schweizer	
SEP	HU269
Westland	
SEP	Bell47

Subpart I - Additional Ratings

AMC1 FCL.800 Aerobatic rating

Theoretical knowledge and flying training

The aim of the aerobatic training is to qualify licence holders to perform aerobatic manoeuvres.

The ATO should issue a certificate of satisfactory completion of the instruction to licence endorsement.

Theoretical knowledge

The theoretical knowledge syllabus should cover the revision or explanation of:

(1) human factors and body limitation:

- (i) spatial disorientation;
- (ii) airsickness;
- (iii) body stress and G-forces, positive and negative;
- (iv) effects of grey- and blackouts.

(2) technical subjects:

- (i) legislation affecting aerobatic flying to include environmental and noise subjects;
- (ii) principles of aerodynamics to include slow flight, stalls and spins, flat and inverted;
- (iii) general airframe and engine limitations (if applicable).

(3) limitations applicable to the specific aircraft category (and type):

- (i) air speed limitations (aeroplane, helicopter, TMG and sailplane, as applicable);
- (ii) symmetric load factors (type-related, as applicable);
- (iii) rolling Gs (type-related, as applicable).

(4) aerobatic manoeuvres and recovery:

- (i) entry parameters;
- (ii) planning systems and sequencing of manoeuvres;
- (iii) rolling manoeuvres;
- (iv) looping manoeuvres;
- (v) combination manoeuvres;
- (vi) entry and recovery from developed spins, flat, accelerated and inverted.

(5) emergency procedures:

- (i) recovery from unusual attitudes;
- (ii) drills to include the use of parachutes (if worn) and aircraft abandonment.

Flying training

The exercises of the aerobatic flying training syllabus should be repeated as necessary until the applicant achieves a safe and competent standard. Having completed the flight training, the student pilot should be able to perform a solo flight containing a sequence of aerobatic manoeuvres. The dual training and the supervised solo training flights should be tailored to the category of aircraft and limited to the permitted manoeuvres of that type of aircraft. The exercises should comprise at least the following practical training items:

(1) confidence manoeuvres and recoveries:

(i) slow flights and stalls;

(ii) steep turns;

(iii) side slips;

(iv) engine restart in-flight (if applicable);

(v) spins and recovery;

(vi) recovery from spiral dives;

(vii) recovery from unusual attitudes.

(2) aerobatic manoeuvres:

(i) Chandelle;

(ii) Lazy Eight;

(iii) rolls;

(iv) loops;

(v) inverted flight;

(vi) Hammerhead turn;

(vii) Immelmann.

AMC1 FCL.805 Sailplane towing and banner towing rating

Theoretical knowledge and flying training

The aim of the towing instruction is to qualify licence holders to tow banners or sailplanes.

The ATO should issue a certificate of satisfactory completion of the instruction that can be used for licence endorsement.

Theoretical knowledge: towing of sailplanes

The theoretical knowledge syllabus for towing of sailplanes should cover the revision or explanation of:

(1) regulations about towing flights;

(2) equipment for the towing activity;

(3) sailplane towing techniques, including:

(i) signals and communication procedures;

(ii) take-off (normal and crosswind);

(iii) in-flight launch procedures;

(iv) descending on tow;

(v) sailplane release procedure;

(vi) tow rope release procedure;

(vii) landing with tow rope connected (if applicable);

(viii) emergency procedures during tow, including equipment malfunctions;

(ix) safety procedures;

(x) flight performance of the applicable aircraft type when towing sailplanes;

(xi) look-out and collision avoidance;

(xii) performance data sailplanes, including:

(A) suitable speeds;

(B) stall characteristics in turns.

Theoretical knowledge: banner towing

The theoretical knowledge syllabus for banner towing should cover the revision or explanation of:

(1) regulations about banner towing;

(2) equipment for the banner towing activity;

(3) ground crew coordination;

(4) pre-flight procedures;

(5) banner towing techniques, including:

(i) take-off launch;

(ii) banner pickup manoeuvres;

(iii) flying with a banner in tow;

(iv) release procedure;

(v) landing with a banner in tow (if applicable);

(vi) emergency procedures during tow, including equipment malfunctions;

(vii) safety procedures;

(viii) flight performance of the applicable aircraft type when towing a heavy or light banner;

(ix) prevention of stall during towing operations.

Flying training: towing of sailplanes

The exercises of the towing training syllabus for towing sailplanes should be repeated as necessary until the student achieves a safe and competent standard and should comprise at least the following practical training items:

(1) take-off procedures (normal and crosswind take-offs);

(2) 360 ° circles on tow with a bank of 30 ° and more;

(3) descending on tow;

(4) release procedure of the sailplane;

(5) landing with the tow rope connected (if applicable);

(6) tow rope release procedure in-flight;

(7) emergency procedures (simulation);

(8) signals and communication during tow.

Flying training: banner towing

The exercises of the towing training syllabus for banner towing should be repeated as necessary until the student achieves a safe and competent standard and should comprise at least the following practical training items:

(1) pickup manoeuvres;

(2) towing in-flight techniques;

(3) release procedures;

(4) flight at critically low air speeds;

(5) maximum performance manoeuvres;

(6) emergency manoeuvres to include equipment malfunctions (simulated);

(7) specific banner towing safety procedures;

(8) go-around with the banner connected;

(9) loss of engine power with the banner attached (simulated).

AMC1 FCL.810(b) Night rating

PPL(H) night rating course

(a) The aim of the course is to qualify PPL(H) holders to exercise the privileges of the licence at night.

(b) The ATO should issue a certificate of satisfactory completion of the instruction that can be used for licence endorsement.

(c) Theoretical knowledge

The theoretical knowledge syllabus should cover the revision or explanation of:

(1) night VMC minima;

(2) rules about airspace control at night and facilities available;

(3) rules about aerodrome ground, runway, landing site and obstruction lighting;

(4) aircraft navigation lights and collision avoidance rules;

(5) physiological aspects of night vision and orientation;

(6) dangers of disorientation at night;

(7) dangers of weather deterioration at night;

(8) instrument systems or functions and errors;

(9) instrument lighting and emergency cockpit lighting systems;

(10) map marking for use under cockpit lighting;

(11) practical navigation principles;

(12) radio navigation principles;

(13) planning and use of safety altitude;

(14) danger from icing conditions, avoidance and escape manoeuvres.

(d) Flying training

The exercises of the night rating flight syllabus should be repeated as necessary until the student achieves a safe and competent standard:

(1) In all cases, exercises 4 to 6 of the night rating flight syllabus should be completed.

(1) For exercises 1 to 3, up to 50 % of the required flight training may be completed in an FSTD(H). However, all items within each exercise should be conducted in a helicopter in-flight.

(2) Items marked (*) should be completed in simulated IMC and may be completed in daylight.

(3) The flying exercises should comprise:

(i) Exercise 1:

(A) revise basic manoeuvres when flying by sole reference to instruments*;

(B) explain and demonstrate transition to instrument flight from visual flight*;

(C) explain and revise recovery from unusual attitudes by sole reference to instruments*.

(ii) Exercise 2:

Explain and demonstrate the use of radio navigation aids when flying by sole reference to instruments, to include position finding and tracking*.

(iii) Exercise 3:

Explain and demonstrate the use of radar assistance*.

(iv) Exercise 4:

(A) explain and demonstrate the use and adjustment of landing light;

(B) explain and demonstrate night hovering:

(a) higher and slower than by day;

(b) avoidance of unintended sideways or backwards movements.

(C) explain and demonstrate night take-off techniques;

(D) explain and demonstrate night circuit technique;

(E) explain and demonstrate night approaches (constant angle) with or without visual approach aids to:

(a) heliports;

(b) illuminated touchdown areas.

(F) practise take-off's, circuits and approaches;

(G) explain and demonstrate night emergency procedures to include:

(a) simulated engine failure (to be terminated with power recovery at a safe altitude);

(b) simulated engine failure, including SE approach and landing (ME only);

(c) simulated inadvertent entry to IMC (not on base leg or final);

(d) simulated hydraulic control failure (to include landing);

(e) internal and external lighting failure;

(f) other malfunctions and emergency procedures as required by the aircraft flight manual.

(v) Exercise 5:

Solo night circuits.

(vi) Exercise 6:

(A) explain and demonstrate night cross-country techniques;

(B) practise night cross-country dual and as SPIC to a satisfactory standard.

AMC1 FCL.815 Mountain rating

Theoretical knowledge and flying training

THEORETICAL KNOWLEDGE	
WHEEL	**SKI**
1. Equipment	
W.1.1 Personal equipment for the flight W.1.2 Aircraft equipment for the flight	S.1.1 Personal equipment for the flight S.1.2 Aircraft equipment for the flight
2. Take-off techniques	
W.2.1 Technique for approach and landing on a mountain surface W.2.2 Rolling techniques of the aircraft on various runway profiles W.2.3 Take-off technique W.2.4 Aircraft and engine performances about altitude	S.2.1 Technique for approach and landing on a mountain surface S.2.2 Landing technique on skis S.2.3 Rolling techniques of the aircraft on skis about the snow nature S.2.4 Take-off technique on surfaces covered with snow S.2.5. Aircraft and engine performances about altitude
3. Rules	
W.3.1 Mountain rating W.3.2 Overflight rules W.3.3 Surfaces classification W.3.4 PIC responsibilities W.3.5 Responsibilities of the surface manager W.3.6 Flight plan	S.3.1 Mountain rating S.3.2 Overflight rules S.3.3 Surfaces classification S.3.4 PIC responsibilities S.3.5 Responsibilities of the surface manager S.3.6 Flight plan
S.3.7 Certification of the ski mounted aeroplanes	
4. Meteorology	
W.4.1 Movements of the air mass W.4.2 Flight consequences W.4.3 Relief effect on the movement of the air masses	S.4.1 Movements of the air mass S.4.2 Flight consequences S.4.3 Relief effect on the movement of the air masses

THEORETICAL KNOWLEDGE	
WHEEL	**SKI**
W.4.4 Altimetry	S.4.4 Altimetry
5. Human Performance and Limitations	
W.5.1 The cold W.5.2 The food W.5.3 The hypoxia W.5.4 The radiance W.5.5 The thirst W.5.6 The tiredness W.5.7 Turbulence effects in altitude	S.5.1 The cold S.5.2 The food S.5.3 The hypoxia S.5.4 The radiance S.5.5 The thirst S.5.6 The tiredness S.5.7 Turbulence effects in altitude
6. Navigation	
W.6.1 Progress of the flight W.6.2 Dead reckoning W.6.4 Progress in the valleys W.6.5 Detection of obstacles (high voltage lines, chairlifts, cables, etc.).	S.6.1 Progress of the flight S.6.2 Dead reckoning S.6.3 The path over the relief S.6.4 Progress in the valleys S.6.5 Detection of obstacles (high voltage lines, chairlifts, cables, etc.)
7. Specific items	
	S.7.1 Knowledge of the snow and assessment of the snow nature in-flight S.7.2 Knowledge of the glacier S.7.3 Life of the glacier S.7.4 Formation of the cracks S.7.5 Snow bridges S.7.6 Avalanches
8. Survival	
	S.8.1 Ways of survival (psychological aspects) S.8.2 Use of the equipments S.8.3 Removal of snow from the aircraft S.8.4 Building of a shelter S.8.5 How to eat and feed

FLIGHT INSTRUCTION	
WHEEL	**SKI**
I.- Navigation	
W.I.1 Flight techniques in the valleys W.I.2 Flight over mountain passes and ridges W.I.3 U-turn in narrow valleys W.I.4 Choice of the flight path of aerology	S.I.I Flight techniques in the valleys S.I.2 Flight over mountain passes and ridges. S.I.3 U-turn in narrow valleys S.I.4 Choice of the flight path of aerology

FLIGHT INSTRUCTION	
WHEEL	**SKI**
W.I.5 Map reading	S.I.5 Map reading
II. – Arrival and reconnaissance	
W.II.1 Choice of the altitude of arrival W.II.2 Choice of the arrival and overflight pattern W.II.3 Choice of the landing pattern W.II.4 Aerology awareness W.II.5 Evaluation of the length of the runway W.II.6 Evaluation of the runway profile (slope and banking) W.II.7 Collision avoidance. W.II.8 Definition of the references for the landing (touchdown point) W.II.9 Determination of the circuit pattern altitude W.II.10 Choice of the final speed depending on the runway profile	S.II.1 Choice of the arrival altitude S.II.2 Choice of the arrival and overflight pattern S.II.3 Description of the circuit pattern S.II.4 Aerology awareness S.II.5 Evaluation of the runway length S.II.6 Evaluation of the runway profile (slope and banking) S.II.7 Collision avoidance S.II.8 Definition of the references for the landing (touchdown point) S.II.9 Determination of the circuit pattern altitude S.II.10 Choice of the final speed depending on the runway profile S.II.11 Choice of the take-off axis S.II.12. Choice of the landing axis S.II.13 Choice of the parking area S.II.14 Observation of the obstacles on the ground (cracks, snow bridges, avalanches) S.II.15 Estimation of the snow nature S.II.15 Estimation of the snow nature S.II.16 Observation of the way to reach a refuge from the landing area
III – Approach and landing	
W.III.1 Landing pattern altitude W.III.2 Precision of flight along the landing path W.III.3 Corrections on the landing path (accuracy and effectiveness) W.III.4 Landing (precision of the flare and of the touchdown point) W.III.5 Taxiing (use of the engine power) on various profiles W.III.6 Parking of the aircraft (depending on the runway profile, the traffic, etc.)	S.III.1 Landing pattern altitude S.III.2 Precision of flight along the landing path S.III.3 Corrections on the landing path (accuracy and effectiveness) S.III.4 Landing (precision of the flare and of the touchdown point) S.III.5 Taxi of the aircraft on various snows and various runway profiles S.III.6 Parking of the aircraft (depending on the snow nature and the profile of the apron) S.III.7 Turns on various snow nature and various ground profiles
IV. – Take-off	
W.IV.1 Safety checks before take-off W.IV.2 Lining up on the runway W.IV.3 Control of the runway axis during take-off W.IV.4 Choice and use of the visual references of the take-off axis	S.IV.1 Safety checks before take-off. S.IV.2 Lining up on the runway S.IV.3 Control of the runway axis during take-off S.IV.4 Choice and use of the visual references of the take-off axis S.IV.5 Acceleration depending on the nature of the snow S.IV.6 Short take-off S.IV.7 Take-off avoiding the skid of the skis

FLIGHT INSTRUCTION	
WHEEL	**SKI**
V. – Survival	
	S.V.1 Use of the snowshoes S.V.2 Use of the markings

AMC2 FCL.815 Mountain rating

Skill test and proficiency check

The skill test for the issue or the proficiency check for the revalidation or renewal of a mountain rating should contain the following elements:

(a) oral examination

This part should be done before the flight and should cover all the relevant parts of the theoretical knowledge. At least one question for each of the following sections should be asked:

(1) specific equipment for a mountain flight (personal and aircraft);

(2) rules of the mountain flight.

If the oral examination reveals a lack in theoretical knowledge, the flight test should not be done and the skill test is failed.

(b) practical skill test

During the flight test, two sites different from the departure airport should be used for recognition, approach, landing and take-off. For the mountain rating ski or the extension from wheel to ski, one of the two different sites should be a glacier.

AMC1 FCL.820 Flight test rating

Training course general

Competency-based training:

(1) Training courses for the flight test rating should be competency-based. The training programme should follow as much as possible the syllabus outlined below, but may be adapted taking into account the previous experience, skill and theoretical knowledge level of the applicants.

(2) It should also be recognised that the syllabi below assume that suitable flight test experience will be gained subsequent to attendance at the course. Should the applicant be significantly experienced already, then consideration should be made of that experience and it is possible that course content might be reduced in areas where that experience has been obtained.

(3) Furthermore, it should be noted that flight test ratings are specific to both a certain category of aircraft (aeroplanes or helicopters) and to a certain category of flight test (category 1 or 2). Therefore, holders of a flight test rating wishing to extend their privileges to further categories of aircraft or to further categories of flight test (this is only relevant for holders of a category 2 flight test rating since the category one flight test rating includes the privileges for category 2 test flights) should not be requested to undertake the same course as an 'ab-initio' applicant. In these cases, the ATO should develop specific 'bridge courses' taking into account the same principles mentioned above.

(4) To allow proper consideration of the applicant's previous experience, a pre-entry assessment of the applicant's skills should be undertaken by the applicant, on the basis of which the ATO may evaluate the level of the applicant to better tailor the course. Thus, the syllabi listed below should be regarded as a list of individual demonstrable competencies and qualifications rather than a list of mandatory training objectives.

Continuous evaluation

Training courses for the flight test rating should be built on a continuous evaluation model to guarantee that successful completion of the course ensures that the applicant has reached the level of competence (both theoretical and practical) to be issued a flight test rating.

Content of the course

In addition, the content of the course should vary taking into account whether the applicant seeks privileges for a category 1 or 2 flight test rating, as well as the relevant category of aircraft, and their level of complexity. To better take these factors into account, training courses for the flight test rating have been divided into two conditions:

(1) condition 1 courses apply to category 1 flight test ratings on:

(i) helicopters certificated in accordance with the standards of CS-27 or CS-29 or equivalent airworthiness codes;

(ii) aeroplanes certificated in accordance with:

(A) the standards of CS-25 or equivalent airworthiness codes; or

(B) the standards of CS-23 or equivalent airworthiness codes, within the commuter category or having an MD above 0.6 or a maximum ceiling above 25000 ft.

(2) condition 2 training courses apply to:

(i) category 2 flight test ratings for:

(A) helicopters certificated in accordance with the standards of CS-27 or CS-29 or equivalent airworthiness codes;

(B) aeroplanes certificated in accordance with:

(a) the standards of CS-25 or equivalent airworthiness codes; or

(b) the standards of CS-23 or equivalent airworthiness codes (included those mentioned in (c)(1)(ii)(B)), except for aeroplanes with a maximum take-off mass of less than 2000 kg.

(ii) category 1 flight tests for aeroplanes certificated in accordance with the standards of CS-23, with a maximum take-off mass of more than 2000kg, with the exclusion of those mentioned in (c)(1)(ii)(B) (which are subject to condition 1 courses).

Aeroplanes

Condition 1 courses for aeroplanes

(1) These courses should include approximately:

(i) 350 hours of ground training;

(ii) 100 hours of flight test training, during which at least 15 flights should be made without an instructor on board;

(iii) principles of test management and risk and safety managements should be integrated throughout the course. In addition, principles and methods applicable to the certification activity, as well as safety assessments should be taught.

(2) These courses should include instruction on at least 10 different aeroplane types, of which at least one should be certificated in accordance with CS-25 standards or equivalent airworthiness codes.

(3) During the course the student should be required to develop at least five substantial flight test reports.

(4) The student should be evaluated through examinations on all of the theoretical knowledge subjects, and undertake a final in-flight test upon completion of the syllabus.

(5) Syllabus. The following subjects should be covered in the course:

CONDITION 1 – AEROPLANES		
Theoretical knowledge	(a) aerodynamics; (b) stability and control or handling qualities; (c) engines and performance; (d) measurements and flight test instrumentation (including telemetry).	
Flight test techniques and flight training	(a) performance: (at least one flight test report should be developed)	(1) air speed calibration; (2) climb ME; (3) take-off and landing, including turboprop or turbofan OEI.
	(b) engines	Turboprop or turbofan limitations and relight envelope
	(c) handling qualities (at least two flight test reports should be developed)	(1) flight controls characteristics; (2) longitudinal handling qualities; (3) longitudinal manoeuvre stability; (4) take-off and landing MET or ME turbofan, including V_{mcq} and V_{mu}; (5) lateral, directional handling qualities; (6) handling qualities evaluation; (7) variable stability demo flights including HOFCS; (8) stalls; (9) spins; (10) V_{mca}.
	(d) systems (at least one flight test report should be developed)	At least three different systems, for example: (1) autopilot or AFCS; (2) glass cockpit evaluation; (3) radio navigation, instruments qualification and integrated avionics; (4) TAWS; (5) ACAS.

CONDITION 1 – AEROPLANES	
	(e) high speed certification test
	(f) final evaluation exercise (a flight test report should be developed)

Condition 2 courses for aeroplanes

(1) These courses should include approximately:

(i) 150 hours of ground training;

(ii) 50 hours of flight test training, during which at least eight flights should be made without an instructor on board.

Principles of test management and risk and safety managements should be integrated throughout the course. In addition, principles and methods applicable to the certification activity, as well as safety assessments should be taught.

(2) These courses should include instruction on at least seven different aeroplane types, of which at least one should be certificated in accordance with CS-25 standards or equivalent airworthiness codes.

(3) During the course the student should be required to develop at least three substantial flight test reports.

(4) The student should be evaluated through examinations on all of the theoretical knowledge subjects, and undertake a final in-flight test upon completion of the syllabus.

(5) Syllabus. The following subjects should be covered in the course:

CONDITION 2 - AEROPLANES		
Theoretical knowledge	(a) aerodynamics; (b) stability and control or handling qualities; (c) engines and performance; (d) measurements and flight test instrumentation (including telemetry).	
Flight test techniques and flight training	(a) performance: (at least one flight test report should be developed)	(1) air speed calibration; (2) climb ME; (3) take-off and landing MET or ME turbofan.
	(b) handling qualities	(1) flight control characteristics; (2) longitudinal static, dynamic stability and control or handling qualities; (3) lateral, directional stability and control or handling qualities; (4) stalls; (5) spins.
	(c) systems (at least one flight test report should be developed)	At least three different systems, for example: (1) autopilot or AFCS; (2) glass cockpit evaluation;

CONDITION 2 - AEROPLANES		
		(3) radio navigation, instruments qualification and integrated avionics; (4) TAWS; (5) ACAS.
	(d) final evaluation exercise (a flight test report should be developed)	

Helicopters

Condition 1 courses for helicopters:

(1) These courses should include approximately:

(i) 350 hours of ground training;

(ii) 100 hours of flight test training, during which at least 20 flights should be made without an instructor on board.

Principles of test management and risk and safety managements should be integrated throughout the course. In addition, principles and methods applicable to the certification activity, as well as safety assessments should be taught.

(2) These courses should include instruction on at least eight different helicopter types, of which at least one should be certificated in accordance with CS-29 standards or equivalent airworthiness codes.

(3) During the course the student should be required to develop at least five substantial flight test reports.

(4) The student should be evaluated through examinations on all of the theoretical knowledge subjects, and undertake a final in-flight test upon completion of the syllabus.

(5) Syllabus. The following subjects should be covered in the course:

CONDITION 1 – HELICOPTERS		
Theoretical knowledge	(a) aerodynamics; (b) stability and control or handling qualities; (c) engines and performance; (d) measurements and flight test instrumentation (including telemetry).	
Flight test techniques and flight training	(a) performance: (at least one flight test report should be developed)	(1) air speed calibration; (2) level flight, climb and descent, vertical and hover performance;
	(b) engines	(1) digital engine governing; (2) turbine or piston engine evaluation.
	(c) handling qualities (at least one flight test report should be developed)	(1) flight control characteristics; (2) longitudinal static, dynamic stability and control or handling qualities; (3) lateral, directional stability and control or handling qualities;

CONDITION 1 – HELICOPTERS		
		(4) ADS 33; (5) teetering rotor assessment; (6) rigid rotor assessment; (7) variable stability demo flights including HOFCS.
	(d) systems (at least one flight test report should be developed)	At least three different systems, for example: (1) navigation management systems; (2) autopilot or AFCS; (3) night vision goggles or electro- optics; (4) glass cockpit evaluation;
(e) height and velocity envelope and EOL, including relights		
	(f) category A procedure	
	(g) vibrations and rotor adjustments	
	(h) auto rotations	
	(i) final evaluation exercise (a flight test report should be developed)	

Condition 2 courses for helicopters

(1) These courses should include approximately:

(i) 150 hours of ground training;

(ii) 50 hours of flight test training, during which at least eight flights should be made without an instructor on board.

Principles of test management and risk and safety management should be integrated throughout the course. In addition, principles and methods applicable to the certification activity, as well as safety assessments should be taught.

(2) These courses should include instruction on at least four different helicopters types, of which at least one should be certificated in accordance with CS-29 standards or equivalent airworthiness codes.

(3) During the course the student should be required to develop at least three substantial flight test reports.

(4) The student should be evaluated through examinations on all of the theoretical knowledge subjects, and undertake a final in-flight test upon completion of the syllabus.

(5) Syllabus. The following subjects should be covered in the course:

CONDITION 2 – HELICOPTERS	
Theoretical knowledge	(a) aerodynamics; (b) stability and control or handling qualities; (c) engines and performance; (d) measurements and flight test instrumentation (including telemetry).

CONDITION 2 – HELICOPTERS		
Flight test techniques and flight training	(a) performance: (at least one flight test report should be developed)	(1) air speed calibration; (2) level flight, climb and descent, vertical and hover performance.
	(b) engines	(1) digital engines governing; (2) turbine or piston engine evaluation.
	(c) handling qualities	(1) flight control characteristics; (2) longitudinal static, dynamic stability and control or handling qualities; (3) lateral, directional stability and control or handling qualities.
	(d) systems ((at least one flight test report should be developed)	at least three different systems, for example: (1) navigation management should be systems; (2) autopilot or AFCS; (3) night vision goggles or electro- optics; (4) glass cockpit evaluation.
	(e) vibration and rotor adjustments	
	(f) final evaluation exercise (a flight test report should be developed)	

AMC1 FCL.825(a) En-Route instrument rating (EIR)

General

Since the privileges of the EIR are only to be exercised in the en-route phase of flight, holders of an EIR should:

(a) at no time accept an IFR clearance to fly a departure, arrival or approach procedure;

(b) notify the ATS if unable to complete a flight within the limitations of their rating.

Conditions for the exercise of the privileges of an en-route instrument rating (EIR)

(c) To comply with FCL.825(a)(2), the holder of an EIR should not commence or continue a flight during which it is intended to exercise the privileges of the rating unless the appropriate weather reports or forecasts for the destination and alternate aerodrome for the period from one hour before until one hour after the planned time of arrival indicates VMC. The flight may be planned only to aerodromes for which such meteorological information is available. When filing a flight plan, the holder of an EIR should include suitable VFR to IFR and IFR to VFR transitions. In any case, the pilot needs to apply the relevant operational rules, which ever are more limiting.

(d) A suitable VFR to IFR transition is any navigational fix

(1) to which the flight can be safely conducted under VFR; and

(2) which is acceptable to ATS if available.

(e) A suitable IFR to VFR transition is any navigational fix

(1) to which the flight can be safely conducted under IFR;

(2) at which VMC conditions exist; and

(3) from where the flight can be safely continued under VFR without having to follow instrument arrival or approach procedures.

AMC1 FCL.825(c) En-route instrument rating (EIR)

Flying training

The flight instruction for the EIR should comprise the following flying exercises:

(a) pre-flight procedures for IFR flights, including the use of the flight manual, meteorological information, appropriate air traffic service documents, filing of an IFR flight plan, including VFR/IFR transitions and diversions;

(b) use of appropriate IFR and VFR charts;

(c) basic instrument flight by sole reference to instruments:

- horizontal flight,
- climbing,
- descending,
- turns in level flight, climbing, descending;

(d) steep turns and recovery from unusual attitudes on full and limited panel;

(e) normal flight on limited panel;

(f) instrument pattern;

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

- transition from visual to instrument flight after departure,
- en route IFR procedures,
- en route holding procedures,
- transition from instrument flight en-route to visual before reaching the Minimum Sector Altitude (MSA);

(h) radio navigation (GPS/VOR);

(i) use of advanced equipment such as autopilot, flight director, stormscope, de-icing equipment, EFIS or radar, as available;

(j) emergency procedures covering the deterioration of meteorological conditions;

(k) at least two IFR approaches in the context of an emergency situation;

(l) use of RT techniques in order to gain a competence to a high standard;

(m) if required, operation of a multi-engine aeroplane during the above range of exercises to include engine failures and cruise flight with one engine simulated inoperative;

(n) the flight instruction should also include at least two flights in controlled airspace under IFR with a high density of traffic and VFR arrivals and departures from aerodromes with a mixture of instrument and visual traffic.

AMC1 FCL.825(d) En-route instrument rating (EIR)

Syllabus of theoretical knowledge for the EIR

For the theoretical knowledge syllabus for the EIR, refer to AMC1 FCL.615(b).

AMC2 FCL.825(d) En-route instrument rating (EIR)

Theoretical knowledge instruction and examination

(a) General

The theoretical knowledge instruction and examination is the same as for the instrument rating following the competency-based modular course according to Appendix 6 Aa.

(b) Theoretical knowledge

The applicant should complete an approved competency-based IR(A) or EIR theoretical knowledge (TK) course. The approved CB-IR(A) or EIR TK course may contain computer-based training, e-learning elements, interactive video, slide/tape presentation, learning carrels and other media as approved by the Kuwait DGCA, in suitable proportions. Approved distance learning (correspondence) courses may also be offered as part of the course. The minimum amount of classroom teaching, as required by ORA.ATO.305, has to be provided.

(c) Theoretical knowledge examination

The number of questions per subject, the distribution of questions and the time allocated to each subject is detailed in AMC2 ARA.FCL.300(b).

AMC3 FCL.825(d) En-route instrument rating (EIR)

Detailed theoretical knowledge syllabus and learning objectives for EIR

For the detailed theoretical knowledge syllabus and learning objectives, refer to AMC2 FCL.615(b) through to AMC8 FCL.615(b).

GM1 FCL.825(d) En-route instrument rating (EIR)

Detailed theoretical knowledge syllabus and learning objectives for EIR

For the detailed theoretical knowledge syllabus and learning objectives, refer to GM1 FCL.615(b).

AMC1 FCL.825(e); (g) En route instrument rating (EIR)

Skill test/proficiency check for the issue, revalidation, or renewal of an en-route instrument rating (EIR)

(a) An applicant for an EIR should have received instrument flight instruction on the same type or class of aeroplane to be used in the test/check.

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

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

Conduct of the test/check

(d) The test/check is intended to simulate a practical flight. The route to be flown shall be chosen by the examiner. An essential element is the ability of the applicant to

plan and conduct the flight from routine briefing material. The applicant should undertake the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board. The duration of the flight should be at least 60 minutes.

(e) Should the applicant choose to terminate a skill test/proficiency check for reasons considered inadequate by the flight examiner, the applicant should retake the entire skill test/proficiency check. If the test /check is terminated for reasons considered adequate by the examiner, only those sections not completed should be tested in a further flight.

(f) At the discretion of the examiner any manoeuvre or procedure of the test/check may be repeated once by the applicant. The examiner may stop the test/check at any stage if it is considered that the applicant's demonstration of flying skill requires a complete retest/recheck.

(g) An applicant should fly the aeroplane from a position where the pilot-in- command functions can be performed and to carry out the test/check as if there is no other crew member. Responsibility for the flight should be allocated in accordance with national regulations.

(h) Minimum descent heights/altitudes and the transition points should be determined by the applicant and agreed by the examiner.

(i) An applicant for an EIR should indicate to the examiner the checks and duties carried out, including the identification of radio facilities. The checks should be completed in accordance with the authorised checklist for the aeroplane on which the test/check is being taken. During pre- flight preparation for the test/check the applicant should determine power settings and speeds. Performance data for take-off, approach and landing should be calculated by the applicant in compliance with the operations manual or flight manual for the aeroplane used.

Flight test tolerances

(j) The applicant should demonstrate the ability to:

- operate the aeroplane within its limitations;
- complete all manoeuvres with smoothness and accuracy;
- exercise good judgment and airmanship;
- apply aeronautical knowledge; and
- maintain control of the aeroplane at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

(k) The following limits should apply corrected to make allowance for turbulent conditions, and the handling qualities and performance of the aeroplane used

Height

Generally	±100 feet

Tracking

on radio aids	±10°

Heading

all engines operating	±10°
with simulated engine failure	±15°

Speed

all engines operating +10 knots/–5 knots

with simulated engine failure +15 knots/–5 knots

Content of the skill test/proficiency check

SECTION 1 PRE-FLIGHT OPERATIONS AND DEPARTURE	
Use of checklist, airmanship, anti/de-icing procedures, etc., apply in all sections.	
a	Use of flight manual (or equivalent) especially a/c performance calculation, mass and balance
b	Use of ATC document, weather document
c	Preparation of ATC flight plan, IFR flight plan/log
d	Pre-flight inspection
e	Weather Minima
f	Taxiing
g	Pre-take-off briefing. Take-off
h	ATC liaison: compliance, R/T procedures
SECTION 2 GENERAL HANDLING	
a	Control of the aeroplane by reference solely to instruments, including: level flight at various speeds, trim
b	Climbing and descending turns with sustained Rate 1 turn
c	Recoveries from unusual attitudes, including sustained 45° bank turns and steep descending turns
d	Recovery from approach to stall in level flight, climbing/descending turns and in landing configuration
e	Limited panel, stabilised climb or descent at Rate 1 turn onto given headings, recovery from unusual attitudes
SECTION 3 EN ROUTE IFR PROCEDURES	
a	Transition to instrument flight
b	Tracking, including interception, e.g. NDB, VOR, RNAV
c	Use of radio aids
d	Level flight, control of heading, altitude and airspeed, power setting, trim technique
e	Altimeter settings
f	Timing and revision of ETAs (En-route hold — if required)
g	Monitoring of flight progress, flight log, fuel usage, systems management
h	Simulated emergency situation(s)
i	Ice protection procedures, simulated if necessary
j	Simulated diversion to alternate aerodrome

k	Transition to visual flight
l	ATC liaison and compliance, R/T procedures
SECTION 4	
	Intentionally left blank
SECTION 5	
a	Setting and checking of navigational aids, identification of facilities
b	Arrival procedures, altimeter settings
c	Approach and landing briefing, including descent/approach/landing checks
d	Visual landing
e	ATC liaison: compliance, R/T procedures
SECTION 6 (multi-engine aeroplanes only) Flight with one engine inoperative	
a	Simulated engine failure during en-route phase of flight
b	ATC liaison: compliance, R/T procedures

AMC1 FCL.825(g)(2)) En-route instrument rating (EIR)

Training flight for revalidation

(a) The training flight for the revalidation of an EIR should be based on the exercise items of the EIR proficiency check as deemed relevant by the instructor and should depend on the experience of the candidate. The training flight should include a briefing including a discussion on threat and error management with a special emphasis on decision making when encountering adverse meteorological conditions, unintentional Instrument Meteorological Conditions (IMC) and navigation flight capabilities.

(b) In any case, a simulated diversion and instrument approach to an alternate aerodrome in the context of an emergency situation during the en route phase in IFR should be demonstrated by the instructor.

AMC1 FCL.825(h) En-route instrument rating (EIR)

Pre-entry assessment and training record

(a) Pre-entry assessment

The assessment to establish the amount of training to be credited and to identify the training needs should be based on the EIR training syllabus established in AMC1 FCL.825(c).

(b) Training record

(1) Before initiating the assessment, the applicant should provide the ATO with a training record containing the details of the previous flight training provided by the IRI(A) or the FI(A). This training record should at least specify the aircraft

type and registration used for the training, the number of flights and the total amount of instrument flight time under instruction. It should also specify all the exercises completed during the training by using the syllabus contained in AMC1 FCL.825(c).

(2) The instructor(s) having provided the training should keep the training records containing all the details of the flight training given for a period of at least 5 years after the completion of the training.

AMC2 FCL.825(h) En-route instrument rating (EIR)

Training aircraft

The aeroplane used for the instrument flight time under instruction provided outside an ATO by an IRI(A) or FI(A) should be:

(a) fitted with primary flight controls that are instantly accessible by both the student and the instructor (for example dual flight controls or a centre control stick). Swing-over flight controls should not be used; and

(b) suitably equipped to simulate instrument meteorological conditions (IMC) and for the instrument flight training required.

AMC1 FCL.825(i) En-route instrument rating (EIR)

Crediting on the basis of an IR(A) rating from a country other than the State of Kuwait Country

In order to be credited in full towards the multi-engine EIR training course requirements, the applicant should:

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

(b) have the minimum experience required in FCL.825 paragraph (i)(3), of which at least 4 hours should be completed in a multi-engine aeroplane.

AMC1 FCL.830 Sailplane Cloud Flying Rating

Theoretical knowledge instruction and flight instruction

(a) Theoretical knowledge instruction

The theoretical knowledge syllabus should cover the revision and/or explanation of:

(1) Human Factors and Body Limitations

- basic aviation physiology in regards cloud flying aspects
- basic aviation psychology
- spatial disorientation

(2) Principles of Flight

- stability
- control
- limitations (load factor and manoeuvres)

(3) Aircraft Instrumentation

– sensors and instruments
– measurement of air data parameters
– gyroscopic instruments

(4) Navigation
– use of GPS
– use of charts
– dead reckoning navigation (DR)
– air traffic regulations — airspace structure
– aeronautical information service
– State of Kuwait regulations regarding cloud flying

(5) Communications
– VHF communications
– relevant weather information terms

(6) Hazards and Emergency Procedures
– icing
– cloud escape procedures
– anti-collision instruments/avionics

(b) Flying training

(1) The exercises of the sailplane cloud flight instruction syllabus should be repeated as necessary until the student achieves a safe and competent standard and should comprise at least the following practical training items, flown solely by reference to instruments:
– straight flight
– turning
– achieving and maintaining heading
– return to straight flight from steeper angle of bank
– position fixing using GPS and aeronautical charts
– position estimating using DR
– basic cloud escape manoeuvre/unusual attitude
– advanced cloud escape manoeuvre on nominated heading

(2) Only exercises under simulated IMC should be conducted in a TMG. However, at least one hour cloud flying training must be flown in a sailplane or powered sailplane (excluding TMG).

AMC2 FCL.830 Sailplane Cloud Flying Rating

Skill test and proficiency check

The skill test for the issue of the cloud flying rating or the proficiency check for fulfilling the requirements in FCL.830(b)(3) and in FCL.830(e)(1) should be conducted in either a sailplane or a powered sailplane (including TMG if the test or check will be flown under simulated IMC only) and should contain the following elements:

(a) Oral examination

This part should be completed before the flight and should cover all the relevant parts of the theoretical knowledge syllabus. At least one question for each of the following sections should be asked:

- Human performance and body limitations;
- Principles of flight;
- Aircraft instrumentation for cloud flying;
- Navigation;
- Communications;
- Hazards and emergency procedures.

If the oral examination reveals a lack in theoretical knowledge, the flight test should not be done and the skill test/proficiency check is failed.

(b) Practical skill test/proficiency check

During the practical test/check, the following limits should apply with appropriate allowance for turbulent conditions and the handling qualities and performance of the sailplane used. Artificial horizon or turn and slip instruments should be used as appropriate:

	Artificial Horizon	Turn & Slip
Straight flight	Heading ±10° IAS ±10kts	Heading ±20° IAS ±15kts
Turning	Angle of bank ±15° IAS ±10kts	Small deviations in rate of turn with a maximum deviation between ½ & full scale IAS ±15kts
Position fixing given: GPS displaying range and bearing to a point	±2NM	±3NM
During the practical test/check, the following exercises should be successfully completed by the applicant, flown solely by reference to instruments and taking into account the limits above:		

- straight flight;
- turning;
- achieving and maintaining heading;
- return to straight flight from steeper angle of bank;
- position fixing using GPS and aeronautical charts;
- position estimating using DR;

- basic cloud escape manoeuvre/unusual attitude;
- advanced cloud escape manoeuvre on nominated heading.

Subpart J - Instructors

GM1 FCL.900 Instructor certificates

General

(a) Nine instructor categories are recognised:

(1) FI certificate: aeroplane (FI(A)), helicopter (FI(H)), airship (FI(As)), sailplane (FI(S)) and balloon (FI(B));

(2) TRI certificate: aeroplane (TRI(A)), helicopter (TRI(H)), powered-lift aircraft (TRI(PL));

(3) CRI certificate: aeroplane (CRI(A));

(4) IRI certificate: aeroplane (IRI(A)), helicopter (IRI(H)) and airship (IRI(As));

(5) SFI certificate: aeroplane (SFI(A)), helicopter (SFI(H)) and powered -lift aircraft (SFI(PL));

(6) MCCI certificate: aeroplanes (MCCI(A)), helicopters (MCCI(H)), powered-lift aircraft(MCCI(PL)) and airships (MCCI(As));

(7) STI certificate: aeroplane (STI(A)) and helicopter (STI(H));

(8) MI certificate: (MI);

(9) FTI certificate: (FTI).

(b) For categories (1) to (4) and for (8) and (9) the applicant needs to hold a pilot licence. For categories (5) to (7) no licence is needed, only an instructor certificate.

(c) A person may hold more than one instructor certificate.

Special conditions

(a) When new aircraft are introduced, requirements such as to hold a licence and rating equivalent to the one for which instruction is being given, or to have adequate flight experience, may not be possible to comply with. In this case, to allow for the first instruction courses to be given to applicants for licences or ratings for these aircraft, competent authorities need the possibility to issue a specific certificate that does not have to comply with the requirements established in this Subpart**.**

(b) The Kuwait DGCA should only give these certificates to holders of other instruction qualifications. As far as possible, preference should be given to persons with at least 100 hours of experience in similar types or classes of aircraft.

(c) When the new aircraft type introduced in an operator's fleet already existed in the State of Kuwait, the Kuwait DGCA should only give the specific certificate to an applicant that is qualified as PIC on that aircraft.

(d) The certificate should ideally be limited in validity to the time needed to qualify the first instructors for the new aircraft in accordance with this Subpart, but in any case it should not exceed the 1 year established in the rule.

GM2 FCL.900(c)(1) Instructor certificates

INSTRUCTION OUTSIDE THE TERRITORY OF THE MEMBER STATES

The competent authority may issue an unrestricted flight instructor (FI) certificate (FI(A) for aeroplanes or FI(H) for helicopters) to an applicant that has at least 100 hours of experience in flight instruction and 25 hours in solo-flight supervision.

AMC1 FCL.915(e) General prerequisites and requirements for instructors

ADDITIONAL REQUIREMENTS FOR INSTRUCTING IN A TRAINING COURSE IN ACCORDANCE WITH FCL.745.A – GENERAL

(a) The objective of the course required by point FCL.915(e)(1) is to train instructors to deliver training on the advanced UPRT course according to point FCL.745.A using the train-to-proficiency concept.
(b) Training should be both theoretical and practical. Practical elements should include the development of specific instructor skills, particularly in the area of teaching upset recovery techniques and strategies, whilst exploring the associated physiological and psychological aspects.
(c) Within 6 months preceding the start of the course, the instructor should have completed a pre-course assessment with an instructor holding the privilege in accordance with FCL.915(e)(1) to assess their ability to undertake the course.
(d) The training course should comprise:
  (1) theoretical knowledge instruction on the theoretical knowledge elements presented in the advanced UPRT course and the additional elements required for an instructor to deliver effective training;
  (2) flight instruction on the exercises used in the advanced UPRT course; and
  (3) flight instruction on recovery from upsets that could result from students mis-handling the aircraft during the advanced UPRT course including spin recovery.

(e) The content of the theoretical knowledge and flight instruction should be tailored to the competence of the applicant as demonstrated during both pre-course and continuous assessment.
(f) Successful completion of the course requires that the instructor:
  (1) demonstrates the resilience to be able to recover from any feasible upset in the aircraft to be used for training;
  (2) demonstrates the ability to provide instruction to achieve the objectives of the advanced UPRT course to a wide range of trainees; and
  (3) manages the physiological and psychological well-being of students during training.

(g) The instructor should be issued with a certificate following successful completion of the course.

AMC2 FCL.915(e) General prerequisites and requirements for instructors

ADDITIONAL REQUIREMENTS FOR INSTRUCTING IN A TRAINING COURSE IN ACCORDANCE WITH FCL.745.A – SYLLABUS

The following tables contain theoretical knowledge (Table 1) and practical training exercises (Table 2) that should be taught in the context of the advanced UPRT course as per point FCL.745.A.

TABLE 1: THEORETICAL KNOWLEDGE	
1.	Completion of a flight risk assessment
2.	Resilience-building strategies, managing startle and surprise
3	The limitations and type-specific characteristics of the aeroplane used for training
4	The importance of adhering to the scenarios that have been validated by the training programme developer
5.	Instructor techniques to induce and manage startle and surprise
6.	Upset recognition and recovery strategies
7.	Disorientation
8.	Distraction
9.	Immediate recognition of student pilot errors
10.	Intervention strategies
11.	Delivery of the theoretical knowledge instruction of the advanced UPRT course

TABLE 2: PRACTICAL TRAINING EXERCISES	
SECTION 1 — PRE-FLIGHT PREPARATION	
1.1	Correct completion of a flight risk assessment (such as weather, terrain, traffic density, student's experience level and capabilities)
1.2	Safety briefing
SECTION 2 — FLIGHT	
2.1	Selection of suitable airspace for the conduct of recovery exercises
2.2	Accurate execution of all of the manoeuvres required for the advanced UPRT course
2.3.	Recovery from upsets that could result from the student or instructor mishandling the aeroplane including: – timely and appropriate intervention; – accelerated stall; – secondary stall; – incipient spin; – fully developed spin; and – Spiral dive.
2.4	Delivery of all of the training exercises in the advanced UPRT course
2.5	Anticipating and immediately recognising incorrect student inputs which might exceed aeroplane limitations and acting swiftly and appropriately to maintain the necessary margins of safety
2.6	Exercises to surprise the student
2.7	Adapt the training programme to take account of the physiological and psychological state of the student
2.8	Ensure the safety of the operation during training by maintaining awareness of the operating environment
2.9	Assess the competence of the student
SECTION 3 — POST-FLIGHT	
3.1	Provide effective instructor feedback to the student and plan subsequent training details
3.2	Avoid negative transfer of training

GM1 FCL.915(e) General prerequisites and requirements for instructors

TRAINING ON SPIN AVOIDANCE AND SPIN RECOVERY

(a) While the purpose of advanced UPRT course is to expose students to psychological and physiological effects, students' responses and actions on controls may take any conceivable variations, including some which can initiate spin entry or, most importantly, can highly aggravate the upset or loss-of-control they are supposed to recover from.
(b) The advanced UPRT course in accordance with point FCL.745.A is not aerobatic training and only requires training for the incipient spin as well as uncoordinated side slipped stalls which are prone to initiating spins. Full spin training or the development of spin recovery proficiency is reserved for the training course in accordance with point FCL.915(e).
(c) Even though most flights will go exactly as planned without an unanticipated departure from controlled flight, the instructor is responsible for the safety of flight despite anomalies or unexpected student inputs.
(d) Even in a case where an aeroplane is not certified for intentional flat or aggravated or inverted spins, it does not mean that mishandled student recovery avoids placing the aeroplane in such a situation. Some student inputs will take the aeroplane uncontrolled far beyond the normal scope of the aerobatic rating as defined in point FCL.800. Those situations might also have the potential to draw the aeroplane outside its certified flight envelope (e.g. overloads, snap-roll departures above limit speed, spin or inverted spin when not certified for, flat spins, etc.). Most importantly, those resulting situations could startle the instructor.
(e) For the reasons specified in point (d), instructors should:
  (1) be trained to the extent of proficiency on the specific type of aircraft they use to deliver the course;
  (2) have academic understanding of the factors assisting or deterring spin recoveries (upright and inverted spins), altitude requirements for safe recovery margins, and other operational considerations;
  (3) demonstrate that they have the ability to early recognise abnormal situations, timely take action, and safely recover from all the conditions that they may encounter in the delivery of training; and
  (4) demonstrate their ability to recover from all spin types, not only from spins entered intentionally, but from spins of unannounced direction of autorotation, and from all potential spin variations, including:
    (i) normal (non-aggravated) spins;
    (ii) flat spins;
    (iii) accelerated spins; and
    (iv) transition spins (incorrect recovery resulting in reversal of rotation).

(f) In the context of points (d) and (e), it is recommended that candidates either hold an aerobatic rating for aeroplanes or have equivalent experience.

AMC1 FCL.915(e)(2) General prerequisites and requirements for instructors

CONTENT OF THE REFRESHER TRAINING FOR UPRT INSTRUCTIONAL PRIVILEGES

(a) The objective of the refresher training is for the instructor to maintain or to re-obtain, as applicable, the level of competence required for instructing on a training course as per point FCL.745.A.
(b) The content of the refresher training should:
  (1) consist of elements from the initial UPRT instructor training course as per point FCL.915(e)(1)(ii); and
  (2) be determined by the ATO on a case-by-case basis, considering the needs of the individual instructor and taking into account the following factors:
  (i) the experience of the instructor;

(ii) the amount of time elapsed since the instructor provided instruction on a training course as per point FCL.745.A for the last time; and
(iii) the performance of the instructor during a simulated UPRT training session comprising exercises from the advanced UPRT course as per point FCL.745.A.
During this simulated training session, another instructor qualified in accordance with point FCL.915(e) should play the role of the student on the advanced UPRT course.

(c) Taking into account the factors listed in (b)(2) above, the ATO may also count the simulated training session as per point (b)(2)(iii) as refresher training without the need for further refresher training sessions, provided that the instructor demonstrates that he or she already possesses the required level of competence.
(d) The completion of the refresher training should be entered in the logbook of the instructor and should be signed by the head of training of the ATO.

AMC1 FCL.920 Instructor competencies and assessment

(a) 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.

(b) The training and assessment of instructors should be made against the following performance standards:

Competence	Performance	Knowledge
Prepare resources	(a) ensures adequate facilities; (b) prepares briefing material; (c) manages available tools.	(a) understand objectives; (b) available tools; (c) competency-based training methods.
Create a climate conducive to learning	(a) establishes credentials, role models appropriate behaviour; (b) clarifies roles; (c) states objectives; (d) ascertains and supports trainees needs.	(a) barriers to learning; (b) learning styles.
Present knowledge	(a) communicates clearly; (b) creates and sustains realism; (c) looks for training opportunities.	teaching methods.
Integrate TEM or CRM	(a)makes TEM or CRM links with technical training. (b) for aeroplanes: makes upset prevention links with technical training.	(a) HF, TEM or CRM. (b) Causes and countermeasures against undesired aircraft states
Manage time to achieve training objectives	allocates time appropriate to achieving competency objective.	syllabus time allocation.
Facilitate learning	(a) encourages trainee participation; (b) shows motivating, patient, confident and assertive manner; (c) conducts one-to-one coaching; (d) encourages mutual support.	(a) facilitation; (b) how to give constructive feedback; (c) how to encourage trainees to ask questions and seek advice;
Assesses trainee performance	(a) assesses and encourages trainee self-assessment of performance against competency standards; (b) makes assessment decision and provide clear feedback; (c) observes CRM behaviour.	(a) observation techniques; (b) methods for recording observations.

Monitor and review progress	(a) compares individual outcomes to defined objectives; (b) identifies individual differences in learning rates; (c) applies appropriate corrective action.	(a) learning styles; (b) strategies for training adaptation to meet individual needs.
Evaluate training sessions	(a) elicits feedback from trainees; (b) tracks training session processes against competence criteria; (c) keeps appropriate records.	(a) competency unit and associated elements; (b) performance criteria.
Report outcome	reports accurately using only observed actions and events.	(a) phase training objectives; (b) individual versus systemic weaknesses.

AMC1 FCL.925 Additional requirements for instructors for the MPL

MPL instructor course

(a) The objectives of the MPL instructors training course are to train applicants to deliver training in accordance with the features of a competency-based approach to training and assessment.

(b) 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.

(c) The course is intended to adapt instructors to conduct competency-based MPL training. It should cover the items specified below:

Theoretical knowledge

(d) Integration of operators and organisations providing MPL training:

(1) reasons for development of the MPL;

(2) MPL training course objective;

(3) adoption of harmonised training and procedures;

(4) feedback process.

(e) The philosophy of a competency-based approach to training: principles of competency- based training.

(f) Regulatory framework, instructor qualifications and competencies:

(1) source documentation;

(2) instructor qualifications;

(3) syllabus structure.

(g) Introduction to Instructional systems design methodologies (see ICAO PANS-TRG Doc):

(1) analysis;

(2) design and production;

(3) evaluation and revision.

(h) Introduction to the MPL training scheme:

(1) training phases and content;

(2) training media;

(3) competency units, elements and performance criteria.

(i) Introduction to human performance limitations, including the principles of threat and error management and appropriate countermeasures developed in CRM:

(1) definitions;

(2) appropriate behaviours categories;

(3) assessment system.

(j) Application of the principles of threat and error management and CRM principles to training:

(1) application and practical uses;

(2) assessment methods;

(3) individual corrective actions;

(4) debriefing techniques.

(k) The purpose and conduct of assessments and evaluations:

(1) basis for continuous assessment against a defined competency standard;

(2) individual assessment;

(3) collection and analysis of data;

(4) training system evaluation.

Practical training

(l) Practical training may be conducted by interactive group classroom modules, or by the use of training devices. The objective is to enable instructors to:

(1) identify behaviours based on observable actions in the following areas:

(i) communications;

(ii) team working;

(iii) situation awareness;

(iv) workload management;

(v) problem solving and decision making.

(2) analyse the root causes of undesirable behaviours;

(3) debrief students using appropriate techniques, in particular:

(i) use of facilitative techniques;

(ii) encouragement of student self-analysis.

(4) agree corrective actions with the students;

(5) determine achievement of the required competency.

AMC2 FCL.925(d)(1) Additional requirements for instructors for the MPL

Renewal of privileges: refresher training

(a) Paragraph (d) of FCL.925 determines that if the applicant has not complied with the requirements to maintain his/her privileges to conduct competency-based approach training, he or she shall receive refresher training at an ATO to reach the level of competence necessary to pass the assessment of instructor competencies. The

amount of refresher training needed should be determined on a case-by-case basis by the ATO, taking into account the following factors:

(1) the experience of the applicant;

(2) the amount of time lapsed since the last time the applicant has conducted training in an MPL course. The amount of training needed to reach the desired level of competence should increase with the time lapsed. In some cases, after evaluating the instructor, and when the time lapsed is very limited, the ATO may even determine that no further refresher training is necessary.

(b) Once the ATO has determined the needs of the applicant, it should develop an individual training programme, which should be based on the MPL instructor course and focus on the aspects where the applicant has shown the greatest needs

GM1 FCL.925 Additional requirements for instructors for the MPL

MPL instructors

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

Phase of training	Qualification
Line flying under supervision according to operational requirements	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	(a) FI(A) or IRI(A) and IR(A)/ME/MCC and 1500 hours multi-crew environment and IR(A) instructional privileges, or (b) FI(A) and MCCI(A), or (c) FI(A) and SFI(A), or (d) FI(A) and TRI(A)
Phase 1: Core flying skills	FI(A) and 500 hours, including 200 hours of instruction Instructor qualifications and privileges should be in accordance with the training items within the phase. STI for appropriate exercises conducted in an FNPT or BITD.

AMC1 FCL.935 Assessment of competence

General

(a) The format and application form for the assessment of competence are determined by the Kuwait DGCA.

(b) When an aircraft is used for the assessment, it should meet the requirements for training aircraft.

(c) If an aircraft is used for the test or check, the examiner acts as the PIC, except in circumstances agreed upon by the examiner when another instructor is designated as PIC for the flight.

(d) During the skill test the applicant occupies the seat normally occupied by the instructor (instructors seat if in an FSTD, or pilot seat if in an aircraft), except in the case of balloons. The examiner, another instructor or, for MPA in an FFS, a real crew under instruction, functions as the 'student'. The applicant is required to explain the relevant exercises and to demonstrate their conduct to the 'student', where appropriate. Thereafter, the 'student' executes the same manoeuvres (if the 'student' is the examiner or another instructor, this can include typical mistakes of inexperienced students). The applicant is expected to correct mistakes orally or, if necessary, by intervening physically.

(e) The assessment of competence should also include additional demonstration exercises, as decided by the examiner and agreed upon with the applicant before the assessment. These additional exercises should be related to the training requirements for the applicable instructor certificate.

(f) All relevant exercises should be completed within a period of 6 months. However, all exercises should, where possible, be completed on the same day. In principle, failure in any exercise requires a retest covering all exercises, with the exception of those that may be retaken separately. The examiner may terminate the assessment at any stage if they consider that a retest is required.

AMC2 FCL.935 Assessment of competence

MCCI, STI, FTI AND MI

In the case of the MCCI, STI and MI, the instructor competencies are assessed continuously during the training course.

AMC3 FCL.935 Assessment of competence

Content of the assessment for the FI

(a) In the case of the FI, the content of the assessment of competence should be the following:

SECTION 1 THEORETICAL KNOWLEDGE ORAL	
1.1	Air law
1.2	Aircraft general knowledge
1.3	Flight performance and planning
1.4	Human performance and limitations
1.5	Meteorology
1.6	Navigation
1.7	Operational procedures

1.8	Principles of flight
1.9	Training administration

Sections 2 and 3 selected main exercises:

SECTION 2 PRE-FLIGHT BRIEFING	
2.1	Visual presentation
2.3	Technical accuracy
2.4	Clarity of explanation
2.5	Clarity of speech
2.6	Instructional technique
2.7	Use of models and aids
2.8	Student participation
SECTION 3 FLIGHT	
3.1	Arrangement of demo
3.2	Synchronisation of speech with demo
3.3	Correction of faults
3.4	Aircraft handling
3.5	Instructional technique
3.6	General airmanship and safety
3.7	Positioning and use of airspace
SECTION 4 ME EXERCISES	
4.1	Actions following an engine failure shortly after take-off[1]
4.2	SE approach and go-around[1]
4.3	SE approach and landing[1]

1 These exercises are to be demonstrated at the assessment of competence for FI for ME aircraft.

SECTION 5 POST-FLIGHT DE-BRIEFING	
5.1	Visual presentation
5.2	Technical accuracy
5.3	Clarity of explanation
5.4	Clarity of speech
5.5	Instructional technique

5.6	Use of models and aids
5.7	Student participation

(b) Section 1, the oral theoretical knowledge examination part of the assessment of competence, is for all FI and is subdivided into two parts:

(1) The applicant is required to give a lecture under test conditions to other 'student(s)', one of whom will be the examiner. The test lecture is to be selected from items of section 1. The amount of time for preparation of the test lecture is agreed upon beforehand with the examiner. Appropriate literature may be used by the applicant. The test lecture should not exceed 45 minutes;

(2) The applicant is tested orally by an examiner for knowledge of items of section 1 and the 'core instructor competencies: teaching and learning' content given in the instructor courses.

(c) Sections 2, 3 and 5 are for all FIs. These sections comprise exercises to demonstrate the ability to be an FI (for example instructor demonstration exercises) chosen by the examiner from the flight syllabus of the FI training courses. The applicant is required to demonstrate FI abilities, including briefing, flight instruction and de-briefing.

(d) Section 4 comprises additional instructor demonstration exercises for an FI for ME aircraft. This section, if applicable, is done in an ME aircraft, or an FFS or FNPT II simulating an ME aircraft. This section is completed in addition to sections 2, 3 and 5.

AMC4 FCL.935 Assessment of competence

Content of the assessment for the SFI

The assessment should consist of at least 3 hours of flight instruction related to the duties of an SFI on the applicable FFS or FTD 2/3.

AMC5 FCL.935 Assessment of competence

Report forms for the instructor certificates

(a) Assessment of competence form for the FI, IRI and CRI certificates:

APPLICATION AND REPORT FORM FOR THE INSTRUCTOR ASSESSMENT OF COMPETENCE			
1	Applicants personal particulars:		
Applicant's last name(s):		First name(s):	
Date of birth:		Tel (home):	Tel (work):
Address:		Country:	
2	Licence details		
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

Total flying hours	PIC SEP or TMG hours	SEP preceding 6 months	Instrument flight instruction	Cross-country hours

4	Pre-entry flight test

I recommend .....for the FI course.	
Name of ATO:	Date of flight test:
Name(s) of FI conducting the test (capital letters):	
Licence number:	
Signature:	

5	Declaration by the applicant

I have received a course of training in accordance with the syllabus for the: (tick as applicable)					
FI certificate FI(A)/(H)/(As)		IRI certificate IRI(A)/(H)/(As)		CRI certificate CRI(A)	
Applicant's name(s): (capital letters)			Signature:		

6	Declaration by the CFI

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

FI certificate FI(A)/(H)/(As)		IRI certificate IRI(A)/(H)/(As)		CRI certificate CRI(A)	
in accordance with the relevant syllabus.					
Flying hours during the course:					
Aircraft or FSTDs used :					
Name(s) of CFI:					
Signature:					
Name of ATO:					
7	Flight instructor examiner's certificate				
I have tested the applicant according to Part-FCL					
A. FLIGHT INSTRUCTOR EXAMINER'S ASSESSMENT (in case of partial pass):					
Theoretical oral examination:			Skill test:		
Passed	Failed		Passed	Failed	
	I recommend further flight or ground training with an instructor before re-test				
	I do not consider further flight or theoretical instruction necessary before re-test (tick as applicable)				
B. FLIGHT INSTRUCTOR EXAMINER'S ASSESSMENT:					
	FI certificate				
	IRI certificate				
	CRI certificate (tick as applicable)				
Name(s) of FIE (capital letters):					
Signature:					
Licence number:			Date:		

(b) Report form for the FI for sailplanes

APPLICATION AND REPORT FORM FOR THE FI(S) ASSESSMENT OF COMPETENCE			
1	Applicants personal particulars:		
Applicant's last name(s):		First name(s):	
Date of birth:		Tel (home):	Tel (work):

Address:		Country:	

2	Licence Details				
Licence type:			Number:		
TMG extension:					

3	Pre-course flying experience			
Total hours	PIC hours	Sailplane (PIC hours and take-offs)	TMG (PIC hours and take-offs)	

4	Pre-entry flight test						
I recommend .....for the FI course.							
Name of ATO:				Date of flight test:			
Name(s) of FI conducting the test (capital letters):							
Licence number:							
Signature:							

5	Declaration by the applicant						
I have received a course of training in accordance with the syllabus for the:							
FI certificate FI(S)							
Applicant's name(s): (capital letters)				Signature:			

6	Declaration by the chief flight instructor						
I certify that ..... has satisfactorily completed a course of training for the							
FI certificate FI(S)							
In accordance with the relevant syllabus.							
Flying hours during the course:				Take-offs during the course:			
Sailplanes, powered sailplanes or TMGs used :							
Name(s) of CFI:							
Signature:							

Name of ATO:				
7	Flight instructor examiner's certificate			
I have tested the applicant according to Part-FCL				
A. FLIGHT INSTRUCTOR EXAMINER'S ASSESSMENT (in case of partial pass):				
Theoretical oral examination:			Skill test:	
Passed	Failed		Passed	Failed
	I recommend further flight or ground training with an FI before re-test			
	I do not consider further flight or theoretical instruction necessary before re-test (tick as applicable)			
B. FLIGHT INSTRUCTOR EXAMINER'S ASSESSMENT:				
	FI certificate			
	Date:			
Name(s) of FIE (capital letters):				
Signature:				
Licence number:		Date:		

(c) Report form for the FI for balloons:

APPLICATION AND REPORT FORM FOR THE FI(B) ASSESSMENT OF COMPETENCE				
1	Applicants personal particulars:			
Applicant's last name(s):		First name(s):		
Date of birth:		Tel (home):	Tel (work):	
Address:		Country:		
2	Licence Details			
Licence type:		Number:		
Class extensions:	1.	Groups:		
	2.	Groups:		
	3.	Groups:		
3	Pre-course flying experience			
Total flying hours in different groups	PIC hours	Hot-air balloon	Gas balloon	Hot-air airship

4	Pre-entry flight test
I recommend .....for the FI course	
Name of ATO:	Date of flight test:
Name(s) of FI conducting the test (capital letters):	
Licence number:	
Signature:	
5	Declaration by the applicant
I have received a course of training in accordance with the syllabus for the:	

FI certificate FI(B)					

Applicant's name(s): (capital letters)	Signature:
6	Declaration by the chief flight instructor
I certify that ..... has satisfactorily completed a course of training for the	

FI certificate FI(B)				

in accordance with the relevant syllabus.	
Flying hours during the course:	Take-offs during the course:
Balloons, hot-air airships used:	
Name(s) of CFI:	
Signature:	
Name of ATO:	
7	Flight Instructor examiner's certificate
I have tested the applicant according to Part-FCL	
A – FLIGHT INSTRUCTOR EXAMINER'S ASSESSMENT in case of partial pass:	

Theoretical oral examination:		Skill test:	
Passed	Failed	Passed	Failed

	I recommend further flight or ground training with an FI before re-test
	I do not consider further flight or theoretical instruction necessary before re-test (tick as applicable)
B – FLIGHT INSTRUCTOR EXAMINER'S ASSESSMENT:	

	FI certificate	
Name(s) of FIE (capital letters):		
Signature:		
Licence number:		Date:

AMC1 FCL.930.FI FI Training course

FI(A), FI(H) and FI(AS) training course general

(a) The aim of the FI training course is to train aircraft licence holders to the level of competence defined in FCL.920.

(b) The training course should develop safety awareness throughout by teaching the knowledge, skills and attitudes relevant to the FI task including at least the following:

(1) refresh the technical knowledge of the student instructor;

(2) train the student instructor to teach the ground subjects and air exercises;

(3) ensure that the student instructor's flying is of a sufficiently high standard;

(4) teach the student instructor the principles of basic instruction and to apply them at the PPL level.

Flight instruction

(c) The remaining 5 hours in FCL.930.FI (b)(3) may be mutual flying (that is, two applicants flying together to practice flight demonstrations).

(d) The skill test is additional to the course training time.

Content

(e) The training course consists of two parts:

(1) Part 1, theoretical knowledge, including the teaching and learning instruction that should comply with AMC1 FCL.920;

(2) Part 2, flight instruction.

Part 1

Teaching and learning

(a) The course should include at least 125 hours of theoretical knowledge instruction, including at least 25 hours teaching and learning instruction.

Content of the teaching and learning instructions (instructional techniques):

(b) The learning process:

(1) motivation;

(2) perception and understanding;

(3) memory and its application;

(4) habits and transfer;

(5) obstacles to learning;

(6) incentives to learning;

(7) learning methods;

(8) rates of learning.

(c) The teaching process:

(1) elements of effective teaching;

(2) planning of instructional activity;

(3) teaching methods;

(4) teaching from the ‘known’ to the ‘unknown’;

(5) use of ‘lesson plans’.

(d) Training philosophies:

(1) value of a structured (approved) course of training;

(2) importance of a planned syllabus;

(3) integration of theoretical knowledge and flight instruction;

(e) Techniques of applied instruction:

(1) theoretical knowledge: classroom instruction techniques:

(i) use of training aids;

(ii) group lectures;

(iii) individual briefings;

(iv) student participation or discussion.

(2) flight: airborne instruction techniques:

(i) the flight or cockpit environment;

(ii) techniques of applied instruction;

(iii) post-flight and in-flight judgement and decision making.

(f) Student evaluation and testing:

(1) assessment of student performance:

(i) the function of progress tests;

(ii) recall of knowledge;

(iii) translation of knowledge into understanding;

(iv) development of understanding into actions;

(v) the need to evaluate rate of progress.

(2) analysis of student errors:

(i) establish the reason for errors;

(ii) tackle major faults first, minor faults second;

(iii) avoidance of over criticism;

(iv) the need for clear concise communication.

(g) Training programme development:

(1) lesson planning;

(2) preparation;

(3) explanation and demonstration;

(4) student participation and practice;

(5) evaluation.

(h) Human performance and limitations relevant to flight instruction:

(1) physiological factors:

(i) psychological factors;

(ii) human information processing;

(iii) behavioural attitudes;

(iv) development of judgement and decision making.

(2) threat and error management.

(i) Specific hazards involved in simulating systems failures and malfunctions in the aircraft during flight:

(1) importance of 'touch drills';

(2) situational awareness;

(3) adherence to correct procedures.

(j) Training administration:

(1) flight or theoretical knowledge instruction records;

(2) pilot's personal flying logbook;

(3) the flight or ground curriculum;

(4) study material;

(5) official forms;

(6) flight manual or equivalent document (for example owner's manual or pilot's operating handbook);

(7) flight authorisation papers;

(8) aircraft documents;

(9) the private pilot's licence regulations.

A. Aeroplanes

Part 2

Air exercises

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

(b) 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:

(1) the applicant's progress and ability;

(2) the weather conditions affecting the flight;

(3) the flight time available;

(4) instructional technique considerations;

(5) the local operating environment.

(c) 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

(d) 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 information on how the flight will be conducted, who is to fly the aeroplane 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.

(e) The four basic components of the briefing will be:

(1) the aim;

(2) principles of flight (briefest reference only);

(3) the air exercise(s) (what, and how and by whom);

(4) airmanship (weather, flight safety etc.).

Planning of flight lessons

(f) The preparation of lesson plans is an essential prerequisite 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

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

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

(i) It is to be noted that airmanship and look-out is a vital ingredient of all flight operations. Therefore, in the following air exercises the relevant aspects of airmanship are to be stressed at all times.

(j) If the privileges of the FI(A) certificate are to include instruction for night flying, exercises 19 and 20 of the flight instruction syllabus should be undertaken at night in addition to by day either as part of the course or subsequent to certification issue.

(k) The student instructor should learn how to identify common errors and how to correct them properly, which should be emphasised at all times.

Syllabus of flight instruction contents

Long briefings and air exercises

Note: though exercise 11b is not required for the PPL(A) course, it is a requirement for the FI course.

Exercise 1: Familiarisation with the aeroplane

(a) Long briefing objectives:

(1) introduction to the aeroplane;

(2) explanation of the cockpit layout;

(3) aeroplane and engine systems;

(4) checklists, drills and controls;

(5) propeller safety;

(i) precautions general;

(ii) precautions before and during hand turning;

(iii) hand swinging technique for starting (if applicable to type).

(6) differences when occupying the instructor's seat;

(7) emergency drills:

(i) action if fire in the air and on the ground: engine, cock or cabin and electrical fire;

(ii) system failure as applicable to type;

(iii) escape drills: location and use of emergency equipment and exits.

(b) Air exercise: all long briefing objectives mentioned above should also be trained on site during the air exercise.

Exercise 2: Preparation for and action after flight

(a) Long briefing objectives:

(1) flight authorisation and aeroplane acceptance, including technical log (if applicable) and certificate of maintenance;

(2) equipment required for flight (maps, etc.);

(3) external checks;

(4) internal checks;

(5) student comfort, harness, seat or rudder pedal adjustment;

(6) starting and warming up checks;

(7) power checks;

(8) running down, system checks and switching off the engine;

(9) leaving the aeroplane, parking, security and picketing;

(10) completion of authorisation sheet and aeroplane serviceability documents.

(b) Air exercise: all long briefing objectives mentioned above should also be trained on site during the air exercise.

Exercise 3: Air experience

(a) Long briefing objectives:

Note: there is no requirement for a long briefing for this exercise.

(b) Air exercise:

(1) air experience;

(2) cockpit layout, ergonomics and controls;

(3) cockpit procedures: stability and control.

Exercise 4: Effects of controls

(a) Long briefing objectives:

(1) function of primary flying controls: when laterally level and banked;

(2) further effect of ailerons and rudder;

(3) effect of inertia;

(4) effect of air speed;

(5) effect of slipstream;

(6) effect of power;

(7) effect of trimming controls;

(8) effect of flaps;

(9) operation of mixture control;

(10) operation of carburettor heat control;

(11) operation of cabin heat or ventilation systems;

(b) Air exercise:

(1) primary effects of flying controls: when laterally level and banked;

(2) further effects of ailerons and rudder;

(3) effect of air speed;

(4) effect of slipstream;

(5) effect of power;
(6) effect of trimming controls;
(7) effect of flaps;
(8) operation of mixture control;
(9) operation of carburettor heat control;
(10) operation of cabin heat or ventilation systems;
(11) effect of other controls as applicable.

Exercise 5: Taxiing

(a) Long briefing objectives:
(1) pre-taxiing checks;
(2) starting, control of speed and stopping;
(3) engine handling;
(4) control of direction and turning (including manoeuvring in confined spaces);
(5) parking area procedures and precautions;
(6) effect of wind and use of flying controls;
(7) effect of ground surface;
(8) freedom of Rudder movement;
(9) marshalling signals;
(10) instrument checks;
(11) ATC procedures;
(12) emergencies: steering failure and brake failure.

(b) Air exercise:
(1) pre-taxiing checks;
(2) starting, control of speed and stopping;
(3) engine handling;
(4) control of direction and turning;
(5) turning in confined spaces;
(6) parking area procedures and precautions;
(7) effect of wind and use of flying control;
(8) effect of ground surface;
(9) freedom of Rudder movement;
(10) marshalling signals;
(11) instrument checks;
(12) ATC procedures;
(13) emergencies: steering failure and brake failure.

Exercise 6: Straight and level flight

(a) Long briefing objectives:
(1) the forces;
(2) longitudinal stability and control in pitch;
(3) relationship of CG to control in pitch;

(4) lateral and directional stability (control of lateral level and balance);
(5) attitude and balance control;
(6) trimming;
(7) power settings and air speeds;
(8) drag and power curves;
(9) range and endurance.

(b) Air exercise:
(1) at normal cruising power;
(2) attaining and maintaining straight and level flight;
(3) demonstration of inherent stability;
(4) control in pitch, including use of elevator trim control;
(5) lateral level, direction and balance, use of rudder trim controls as applicable at selected air speeds (use of power):
(i) effect of drag and use of power (two air speeds for one power setting);
(ii) straight and level in different aeroplane configurations (flaps and landing gear);
(iii) use of instruments to achieve precision flight.

Exercise 7: Climbing

(a) Long briefing objectives:
(1) the forces;
(2) relationship between power or air speed and rate of climb (power curves maximum rate of climb (V_y));
(3) effect of mass;
(4) effect of flaps;
(5) engine considerations;
(6) effect of density altitude;
(7) the cruise climb;
(8) maximum angle of climb (V_x).

(b) Air exercise:
(1) entry and maintaining the normal maximum rate climb;
(2) levelling off;
(3) levelling off at selected altitudes;
(4) climbing with flaps down;
(5) recovery to normal climb;
(6) en-route climb (cruise climb);
(7) maximum angle of climb;
(8) use of instruments to achieve precision flight.

Exercise 8: Descending

(a) Long briefing objectives:
(1) the forces;
(2) glide descent: angle, air speed and rate of descent;

(3) effect of flaps;
(4) effect of wind;
(5) effect of mass;
(6) engine considerations;
(7) power assisted descent: power or air speed and rate of descent;
(8) cruise descent;
(9) sideslip.

(b) Air exercise:
(1) entry and maintaining the glide;
(2) levelling off;
(3) levelling off at selected altitudes;
(4) descending with flaps down;
(5) powered descent: cruise descent (including effect of power and air speed);
(6) side-slipping (on suitable types);
(7) use of instrument to achieve precision flight.

Exercise 9: Turning

(a) Long briefing objectives:
(1) the forces;
(2) use of controls;
(3) use of power;
(4) maintenance of attitude and balance;
(5) medium level turns;
(6) climbing and descending turns;
(7) slipping turns;
(8) turning onto selected headings: use of gyro heading indicator and magnetic compass.

(b) Air exercise:
(1) entry and maintaining medium level turns;
(2) resuming straight flight;
(3) faults in the turn (incorrect pitch, bank and balance);
(4) climbing turns;
(5) descending turns;
(6) slipping turns (on suitable types);
(7) turns to selected headings: use of gyro heading indicator and magnetic compass
(8) use of instruments to achieve precision flight;

Note: stall or spin awareness and avoidance training consists of exercises 10a, 10b and 11a.

Exercise 10a: Slow flight

(a) Long briefing objectives:
(1) aeroplane handling characteristics during slow flight at:

(i) V_{s1} & V_{so} + 10 knots;

(ii) V_{s1} & V_{so} + 5 knots.

(2) slow flight during instructor induced distractions;

(3) effect of overshooting in configurations where application of engine power causes a strong 'nose-up' trim change.

(b) Air exercise:

(1) safety checks;

(2) introduction to slow flight;

(3) controlled slow flight in the clean configuration at:

(i) V_{s1} + 10 knots and with flaps down;

(ii) V_{so} + 10 knots;

(iii) straight and level flight;

(iv) level turns;

(v) climbing and descending;

(vi) climbing and descending turns.

(4) controlled slow flight in the clean configuration at:

(i) V_{s1} + 5 knots and with flaps down;

(ii) V_{so} + 5 knots;

(iii) straight and level flight;

(iv) level turns;

(v) climbing and descending;

(vi) climbing and descending turns;

(vii) descending 'unbalanced' turns at low air speed: the need to maintain balanced flight.

(5) 'instructor induced distractions' during flight at low air speed: the need to maintain balanced flight and a safe air speed;

(6) effect of going around in configurations where application of engine power causes a strong 'nose up' trim change.

Exercise 10b: Stalling

(a) Long briefing objectives:

(1) characteristics of the stall;

(2) angle of attack;

(3) effectiveness of the controls at the stall;

(4) factors affecting the stalling speed:

(i) effect of flaps, slats and slots;

(ii) effect of power, mass, CG and load factor.

(5) effects of unbalance at the stall;

(6) symptoms of the stall;

(7) stall recognition and recovery;

(8) stalling and recovery:

(i) without power;

(ii) with power on;

(iii) with flaps down;

(iv) maximum power climb (straight and turning flight to the point of stall with uncompensated yaw);

(v) stalling and recovery during manoeuvres involving more than 1 G (accelerated stalls, including secondary stalls and recoveries);

(vi) recovering from incipient stalls in the landing and other configurations and conditions;

(vii) recovering at the incipient stage during change of configuration;

(viii) stalling and recovery at the incipient stage with 'instructor induced' distractions.

Note: consideration is to be given to manoeuvre limitations and references to the flight manual or equivalent document (for example owner's manual or pilot's operating handbook) in relation to mass and balance limitations. The safety checks should take into account the minimum safe altitude for initiating such exercises in order to ensure an adequate margin of safety for the recovery. If specific procedures for stalling or spinning exercises and for the recovery techniques are provided by the flight manual or equivalent document (for example owner's manual or pilot's operating handbook), they have to be taken into consideration. These factors are also covered in the next exercise spinning.

(b) Air exercise:

(1) safety checks;

(2) symptoms of the stall;

(3) stall recognition and recovery:

(i) without power;

(ii) with power on;

(iii) recovery when a wing drops at the stall;

(iv) stalling with power 'on' and recovery;

(v) stalling with flap 'down' and recovery;

(vi) maximum power climb (straight and turning flight) to the point of stall with uncompensated yaw: effect of unbalance at the stall when climbing power is being used;

(vii) stalling and recovery during manoeuvres involving more than 1 G (accelerated stalls, including secondary stalls and recoveries);

(viii) recoveries from incipient stalls in the landing and other configurations and conditions;

(ix) recoveries at the incipient stage during change of configuration;

(x) instructor induced distractions during stalling.

Note: consideration of manoeuvre limitations and the need to refer to the aeroplane manual and weight (mass) and balance calculations. The safety checks should take into account the minimum safe altitude for initiating such exercises in order to ensure an adequate margin of safety for the recovery. If specific procedures for stalling or spinning exercises and for the recovery techniques are provided by the flight manual or equivalent document (for example owner's manual or pilot's operating handbook), they have to be taken into consideration. These factors are to be covered in the next exercise: spinning.

Exercise 11a: Spin recovery at the incipient stage

(a) Long briefing objectives:

(1) causes, stages, autorotation and characteristics of the spin;

(2) recognition and recovery at the incipient stage: entered from various flight attitudes;

(3) aeroplane limitations.

(b) Air exercise:

(1) aeroplane limitations;

(2) safety checks;

(3) recognition at the incipient stage of a spin;

(4) recoveries from incipient spins entered from various attitudes with the aeroplane in the clean configuration, including instructor induced distractions.

Exercise 11b: Spin recovery at the developed stage

(a) Long briefing objectives:

(1) spin entry;

(2) recognition and identification of spin direction;

(3) spin recovery;

(4) use of controls;

(5) effects of power or flaps (flap restriction applicable to type);

(6) effect of the CG upon spinning characteristics;

(7) spinning from various flight attitudes;

(8) aeroplane limitation;

(9) safety checks.

(b) Air exercise:

(1) aeroplane limitations;

(2) safety checks;

(3) spin entry;

(4) recognition and identification of the spin direction;

(5) spin recovery (reference to flight manual);

(6) use of controls;

(7) effects of power or flaps (restrictions applicable to aeroplane type);

(8) spinning and recovery from various flight attitudes.

Exercise 12: Take-off and climb to downwind position

(a) Long briefing objectives:

(1) handling: factors affecting the length of take-off run and initial climb;

(2) correct lift off speed, use of elevators (safeguarding the nose wheel), rudder and power;

(3) effect of wind (including crosswind component);

(4) effect of flaps (including the decision to use and the amount permitted);

(5) effect of ground surface and gradient upon the take-off run;

(6) effect of mass, altitude and temperature on take-off and climb performance;

(7) pre take-off checks;

(8) ATC procedure before take-off;

(9) drills, during and after take-off;

(10) noise abatement procedures;

(11) tail wheel considerations (as applicable);

(12) short or soft field take-off considerations or procedures;

(13) emergencies:

(i) aborted take-off;

(ii) engine failure after take-off.

(14) ATC procedures.

(b) Air exercise:

(1) take-off and climb to downwind position;

(2) pre take-off checks;

(3) into wind take-off;

(4) safeguarding the nose wheel;

(5) crosswind take-off;

(6) drills during and after take-off;

(7) short take-off and soft field procedure or techniques (including performance calculations);

(8) noise abatement procedures.

Exercise 13: Circuit, approach and landing

(a) Long briefing objectives:

(1) downwind leg, base leg and approach: position and drills;

(2) factors affecting the final approach and the landing run;

(3) effect of mass;

(4) effects of altitude and temperature;

(5) effect of wind;

(6) effect of flap;

(7) landing;

(8) effect of ground surface and gradient upon the landing run;

(9) types of approach and landing:

(i) powered;

(ii) crosswind;

(iii) flapless (at an appropriate stage of the course);

(iv) glide;
(v) short field;
(vi) soft field.

(10) tail wheel aeroplane considerations (as applicable);
(11) missed approach;
(12) engine handling;
(13) wake turbulence awareness;
(14) windshear awareness;
(15) ATC procedures;
(16) mislanding and go-around;
(17) special emphasis on look-out.

(b) Air exercise:
(1) circuit approach and landing;
(2) circuit procedures: downwind and base leg;
(3) powered approach and landing;
(4) safeguarding the nose wheel;
(5) effect of wind on approach and touchdown speeds and use of flaps;
(6) crosswind approach and landing;
(7) glide approach and landing;
(8) flapless approach and landing (short and soft field);
(9) short field and soft field procedures;
(10) wheel landing (tail wheel aircraft);
(11) missed approach and go-around;
(12) mislanding and go-around;
(13) noise abatement procedures.

Exercise 14: First solo and consolidation

Note: a summary of points to be covered before sending the student on first solo.

(a) Long briefing objectives:

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

(1) procedures for leaving and rejoining the circuit;
(2) local area (restrictions, controlled airspace, etc.);
(3) compass turns;
(4) QDM meaning and use.

(b) Air exercise: all long briefing objectives mentioned above should also be trained on site during the air exercise.

Exercise 15: Advanced turning

(a) Long briefing objectives:

(1) the forces;

(2) use of power;

(3) effect of load factor:

(i) structural considerations;

(ii) increased stalling speed.

(4) physiological effects;

(5) rate and radius of turn;

(6) steep, level, descending and climbing turns;

(7) stalling in the turn and how to avoid it;

(8) spinning from the turn: recovery at the incipient stage;

(9) spiral dive;

(10) unusual attitudes and recoveries.

Note: considerations are to be given to manoeuvre limitations and reference to the flight manual or equivalent document (for example owner's manual or pilot's operating handbook) in relation to mass and balance, and any other restrictions for practice entries to the spin.

(b) Air exercise:

(1) level, descending and climbing steep turns;

(2) stalling in the turn;

(3) spiral dive;

(4) spinning from the turn;

(5) recovery from unusual attitudes;

(6) maximum rate turns.

Exercise 16: Forced landing without power

(a) Long briefing objectives:

(1) selection of forced landing areas;

(2) provision for change of plan;

(3) gliding distance: consideration;

(4) planning the descent;

(5) key positions;

(6) engine failure checks;

(7) use of radio: R/T 'distress' procedure;

(8) base leg;

(9) final approach;

(10) go-around;

(11) landing considerations;

(12) actions after landing: aeroplane security;

(13) causes of engine failure.

(b) Air exercise:

(1) forced landing procedures;

(2) selection of landing area:

(i) provision for change of plan;

(ii) gliding distance considerations.

(3) planning the descent;

(4) key positions;

(5) engine failure checks;

(6) engine cooling precautions;

(7) use of radio;

(8) base leg;

(9) final approach;

(10) landing;

(11) actions after landing: when the exercise is conducted at an aerodrome;

(12) aeroplane security.

Exercise 17: Precautionary landing

(a) Long briefing objectives:

(1) occasions when necessary (in-flight conditions);

(2) landing area selection and communication (R/T procedure);

(3) overhead inspection;

(4) simulated approach;

(5) climb away;

(6) landing area selection:

(i) normal aerodrome;

(ii) disused aerodrome;

(iii) ordinary field;

(7) circuit and approach;

(8) actions after landing; aeroplane security.

(b) Air exercise:

(1) occasions when necessary (in-flight conditions):

(2) landing area selection

(3) overhead inspection

(4) simulated approach

(5) climb away

(6) landing area selection:

(i) normal aerodrome;

(ii) disused aerodrome;

(iii) ordinary field;

(7) circuit and approach;

(8) actions after landing; aeroplane security;

Exercise 18a: Navigation

(a) Long briefing objectives:

(1) flight planning;

(i) weather forecast and actual(s);

(ii) map selection, orientation, preparation and use:

(A) choice of route;

(B) regulated or controlled airspace;

(C) danger, prohibited and restricted areas;

(D) safety altitude.

(iii) calculations:

(A) magnetic heading(s) and time(s) en-route;

(B) fuel consumption;

(C) mass and balance;

(D) mass and performance.

(iv) flight information:

(A) NOTAMs etc.;

(B) noting of required radio frequencies;

(C) selection of alternate aerodrome(s).

(v) aeroplane documentation.

(vi) notification of the flight:

(A) pre-flight administration procedures;

(B) flight plan form (where appropriate).

(2) departure;

(i) organisation of cockpit workload;

(ii) departure procedures:

(A) altimeter settings;

(B) setting heading procedures;

(C) noting of ETA(s).

(iii) en-route map reading: identification of ground features;

(iv) maintenance of altitudes and headings;

(v) revisions to ETA and heading, wind effect, drift angle and groundspeed checks;

(vi) log keeping;

(vii) use of radio (including VDF if applicable);

(viii) minimum weather conditions for continuance of flight;

(ix) 'in-flight' decisions;

(x) diversion procedures;

(xi) operations in regulated or controlled airspace;

(xii) procedures for entry, transit and departure;

(xiii) navigation at minimum level;

(xiv) uncertainty of position procedure, including R/T procedure;

(xv) lost procedure;

(xvi) use of radio navaids.

(3) arrival procedures and aerodrome circuit joining procedures:

(i) ATC liaison, R/T procedure, etc.;

(ii) altimeter setting,

(iii) entering the traffic pattern (controlled or uncontrolled aerodromes);

(iv) circuit procedures;

(v) parking procedures;

(vi) security of aircraft;

(vii) refuelling;

(viii) booking in.

(b) Air exercise:

(1) flight planning:

(i) weather forecast and actual(s);

(ii) map selection and preparation:

(A) choice of route;

(B) regulated or controlled airspace;

(C) danger, prohibited and restricted areas;

(D) safety altitude.

(iii) calculations:

(A) magnetic heading(s) and time(s) en-route;

(B) fuel consumption;

(C) mass and balance;

(D) mass and performance.

(iv) flight information:

(A) NOTAMs etc.;

(B) noting of required radio frequencies;

(C) selection of alternate aerodromes.

(v) aircraft documentation;

(vi) notification of the flight:

(A) flight clearance procedures (as applicable);

(B) flight plans.

(2) aerodrome departure;

(i) organisation of cockpit workload;

(ii) departure procedures:

(A) altimeter settings;

(B) en-route:

(C) noting of ETA(s).

(iii) wind effect, drift angle and ground speed checks;

(iv) maintenance of altitudes and headings;

(v) revisions to ETA and heading;

(vi) log keeping;

(vii) use of radio (including VDF if applicable);

(viii) minimum weather conditions for continuance of flight;

(ix) 'in-flight' decisions;

(x) diversion procedure;

(xi) operations in regulated or controlled airspace;

(xii) procedures for entry, transit and departure;

(xiii) uncertainty of position procedure;

(xiv) lost procedure;

(xv) use of radio navaids.

(3) arrival procedures and aerodrome joining procedures:

(i) ATC liaison, R/T procedure etc.;

(ii) altimeter setting,

(iii) entering the traffic pattern;

(iv) circuit procedures;

(v) parking procedures

(vi) security of aircraft;

(vii) refuelling;

(viii) booking in.

Exercise 18b: Navigation at lower levels and in reduced visibility

(a) Long briefing objectives:

(1) general considerations:

(i) planning requirements before flight in entry or exit lanes;

(ii) ATC rules, pilot qualifications and aircraft equipment;

(iii) entry or exit lanes and areas where specific local rules apply.

(2) low level familiarisation:

(i) actions before descending;

(ii) visual impressions and height keeping at low altitude;

(iii) effects of speed and inertia during turns;

(iv) effects of wind and turbulence;

(3) low level operation:

(i) weather considerations;

(ii) low cloud and good visibility;

(iii) low cloud and poor visibility;

(iv) avoidance of moderate to heavy rain showers;

(v) effects of precipitation;

(vi) joining a circuit;

(vii) bad weather circuit, approach and landing.

(b) Air exercise:

(1) general considerations: entry or exit lanes and areas where specific local rules apply;

(2) low level familiarisation:

(i) actions before descending;

(ii) visual impressions and height keeping at low altitude;

(iii) effects of speed and inertia during turns;

(iv) effects of wind and turbulence;

(v) hazards of operating at low levels;

(3) low level operation:

(i) weather considerations;

(ii) low cloud and good visibility;

(iii) low cloud and poor visibility;

(iv) avoidance of moderate to heavy rain showers;

(v) effects of precipitation (forward visibility);

(vi) joining a circuit;

(vii) bad weather circuit, approach and landing.

Exercise 18c: Use of radio navigation AIDS under VFR

(a) Long briefing objectives:

(1) use of VOR:

(i) availability, AIP and frequencies;

(ii) signal reception range;

(iii) selection and identification;

(iv) radials and method of numbering;

(v) use of OBS;

(vi) to or from indication and station passage;

(vii) selection, interception and maintaining a radial;

(viii) use of two stations to determine position.

(2) use of ADF equipment:

(i) availability of NDB stations, AIP and frequencies;

(ii) signal reception range;

(iii) selection and identification;

(iv) orientation in relation to NDP;

(v) homing to an NDP.

(3) use of VHF/DF:

(i) availability. AIP and frequencies;

(ii) R/T procedures;

(iii) obtaining QDMs and QTEs.

(4) use of radar facilities:

(i) availability and provision of service and AIS;

(ii) types of service;

(iii) R/T procedures and use of transponder:

(A) mode selection;

(B) emergency codes.

(5) use of distance DME:

(i) availability and AIP;

(ii) operating modes;

(iii) slant range.

(6) use of GNSS (RNAV – SATNAV):

(i) availability;

(ii) operating modes;

(iii) limitations.

(b) Air exercise:

(1) use of VOR:

(i) availability, AIP and frequencies;

(ii) selection and identification;

(iii) use of OBS;

(iv) to or from indications: orientation;

(v) use of CDI;

(vi) determination of radial;

(vii) intercepting and maintaining a radial;

(viii) VOR passage;

(ix) obtaining a fix from two VORs.

(2) use of ADF equipment;

(i) availability of NDB stations, AIP and frequencies;

(ii) selection and identification;

(iii) orientation relative to the beacon;

(iv) homing.

(3) use of VHF/DF:

(i) availability, AIP and frequencies;

(ii) R/T procedures and ATC liaison;

(iii) obtaining a QDM and homing.

(4) use of en-route or terminal radar:

(i) availability and AIP;

(ii) procedures and ATC liaison;

(iii) pilot's responsibilities;

(iv) secondary surveillance radar;

(v) transponders;

(vi) code selection;

(vii) interrogation and reply.

(5) use of DME:

(i) station selection and identification;

(ii) modes of operation.

(6) use of GNSS (RNAV – SATNAV):

(i) setting up;

(ii) operation;

(iii) interpretation.

Exercise 19: Basic instrument flight

(a) Long briefing objectives:

(1) flight instruments;

(i) physiological sensations;

(ii) instrument appreciation;

(iii) attitude instrument flight;
(iv) pitch indications;
(v) bank indications;
(vi) different dial presentations;
(vii) introduction to the use of the attitude indicator;
(viii) pitch attitude;
(ix) bank attitude;
(x) maintenance of heading and balanced flight;
(xi) instrument limitations (inclusive system failures).

(2) attitude, power and performance;
(i) attitude instrument flight:
(ii) control instruments;
(iii) performance instruments;
(iv) effect of changing power and configuration;
(v) cross-checking the instrument indications;
(vi) instrument interpretation;
(vii) direct and indirect indications (performance instruments);
(viii) instrument lag;
(ix) selective radial scan;

(3) basic flight manoeuvres (full panel);
(i) straight and level flight at various air speeds and aeroplane configurations;
(ii) climbing;
(iii) descending;
(iv) standard rate turns onto pre-selected headings:
(A) level;
(B) climbing;
(C) descending.

(b) Air exercise:

(1) Introduction to instrument flying
(i) flight instruments;
(ii) physiological sensations;
(iii) instrument appreciation;
(iv) attitude instrument flight;
(v) pitch attitude;
(vi) bank attitude;
(vii) maintenance of heading and balanced flight;

(2) attitude, power and performance;
(i) attitude instrument flight;
(ii) effect of changing power and configuration;
(iii) cross-checking the instruments;

(iv) selective radial scan;

(3) basic flight manoeuvres (full panel);

(i) straight and level flight at various air speeds and aeroplane configurations;

(ii) climbing;

(iii) descending;

(iv) standard rate turns onto pre-selected headings:

(A) level;

(B) climbing;

(C) descending.

Exercise 20: Night flying (if night instructional qualification required)

(a) Long briefing objectives:

(1) start up procedures;

(2) local procedures: including ATC liaison;

(3) taxiing:

(i) parking area and taxiway lighting;

(ii) judgement of speed and distances;

(iii) use of taxiway lights;

(iv) avoidance of hazards: obstruction lighting;

(v) instrument checks;

(vi) holding point: lighting procedure;

(vii) initial familiarisation at night;

(viii) local area orientation;

(ix) significance of lights on other aircraft;

(x) ground obstruction lights;

(xi) division of piloting effort: external or instrument reference;

(xii) rejoining procedure;

(xiii) aerodrome lighting: approach and runway lighting (including VASI and PAPI):

(A) threshold lights;

(B) approach lighting;

(C) visual approach slope indicator systems.

(4) night circuits;

(i) take-off and climb:

(A) line up;

(B) visual references during the take-off run;

(C) transfer to instruments;

(D) establishing the initial climb;

(E) use of flight instruments;

(F) instrument climb and initial turn.

(ii) circuit:

(A) aeroplane positioning: reference to runway lighting;
(B) the traffic pattern and look-out;
(C) initial approach and runway lighting demonstration;
(D) aeroplane positioning;
(E) changing aspect of runway lights and VASI (or PAPI);
(F) intercepting the correct approach path;
(G) the climb away.

(iii) approach and landing:
(A) positioning, base leg and final approach;
(B) diurnal wind effect;
(C) use of landing lights;
(D) the flare and touchdown;
(E) the roll out;
(F) turning off the runway: control of speed.

(iv) missed approach:
(A) use of instruments;
(B) re-positioning in the circuit pattern;

(5) night navigation:
(i) particular emphasis on flight planning;
(ii) selection of ground features visible at night:
(A) air light beacons;
(B) effect of cockpit lighting on map colours;
(C) use of radio aids;
(D) effect of moonlight upon visibility at night;
(iii) emphasis on maintaining a 'minimum safe altitude';
(iv) alternate aerodromes: restricted availability;
(v) restricted recognition of weather deterioration;
(vi) lost procedures;

(6) night emergencies;
(i) radio failure;
(ii) failure of runway lighting;
(iii) failure of aeroplane landing lights;
(iv) failure of aeroplane internal lighting;
(v) failure of aeroplane navigation lights;
(vi) total electrical failure;
(vii) abandoned take-off;
(viii) engine failure;
(ix) obstructed runway procedure.

(b) Air exercise: during the air exercise all long briefing objectives mentioned above should also be trained on site and the student instructor should demonstrate the following items:

(1) how to plan and to perform a flight at night;

(2) how to advise the student pilot to plan and prepare a flight at night;

(3) how to advise the student pilot to perform a flight at night;

(4) how to analyse and correct errors as necessary.

B. Helicopters

Ground instruction

Note: During ground instruction the student instructor should pay specific attention to the teaching of enhanced ground instruction in weather interpretation, planning and route assessment, decision making on encountering DVE including reversing course or conduction a precautionary landing.

Part 2

Air exercises

(a) The air exercises are similar to those used for the training of PPL(H) but with additional items designed to cover the needs of an FI.

(b) 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:

(1) the applicant's progress and ability;

(2) the weather conditions affecting the flight;

(3) the flight time available;

(4) instructional technique considerations;

(5) the local operating environment;

(6) applicability of the exercises to the helicopter type.

(c) 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

(d) The briefing normally includes a statement of the objectives and a brief reference 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 about who is to fly the helicopter 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.

(e) The four basic components of the briefing will be:

(1) the aim;

(2) principles of flight (briefest reference only);

(3) the air exercise(s) (what, and how and by whom);

(4) airmanship (weather, flight safety etc.).

Planning of flight lessons

(f) The preparation of lesson plans is an essential prerequisite 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

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

(h) During this training, except when acting as a student pilot for mutual flights, the student instructor occupies the seat normally occupied by the FI(H).

(i) It is to be noted that airmanship and look-out is a vital ingredient of all flight operations. Therefore, in the following air exercises the relevant aspects of airmanship are to be stressed at all times.

(j) If the privileges of the FI(H) certificate are to include instruction for night flying, exercise 28 should be undertaken either as part of the course or subsequent to certificate issue.

(k) The student instructor should learn how to identify common errors and how to correct them properly, which should be emphasised at all times.

(l) The student instructor should be trained to keep in mind that wherever possible, flight simulation should be used to demonstrate to student pilots the effects of flight into DVE and to enhance their understanding and need for avoidance of this potentially fatal flight regime.

Syllabus of flight instruction contents

Long briefings and air exercises

Exercise 1: Familiarisation with the helicopter

(a) Long briefing objectives:

(1) introduction to the helicopter;

(2) explanation of the cockpit layout;

(3) helicopter and engine systems;

(4) checklist(s) and procedures;

(5) familiarisation with the helicopter controls;

(6) differences when occupying the instructor’s seat;

(7) emergency drills:

(i) action if fire in the air and on the ground: engine, cockpit or cabin and electrical fire;

(ii) system failure drills as applicable to type;

(iii) escape drills: location and use of emergency equipment and exits.

(b) Air exercise: all long briefing objectives mentioned above should also be trained on site during the air exercise.

Exercise 2: Preparation for and action after flight

(a) Long briefing objectives:

(1) flight authorisation and helicopter acceptance, including technical log (if applicable) and certificate of maintenance:

(2) equipment required for flight (maps, etc.);

(3) external checks;

(4) internal checks;

(5) student comfort, harness, seat and rudder pedal adjustment;

(6) starting and after starting checks;

(7) system, power or serviceability checks (as applicable);

(8) closing down or shutting down the helicopter (including system checks).

(9) parking and leaving the helicopter (including safety or security as applicable);

(10) completion of authorisation sheet and helicopter serviceability documents.

(b) Air exercise: all long briefing objectives mentioned above should also be trained on site during the air exercise.

Exercise 3: Air experience

(a) Long briefing objectives:

Note: there is no requirement for a long briefing for this exercise.

(b) Air exercise:

(1) air experience;

(2) cockpit layout, ergonomics and controls;

(3) cockpit procedures: stability and control.

Exercise 4: Effects of controls

(a) Long briefing objectives:

(1) function of the flying controls (primary and secondary effect);

(2) effect of air speed;

(3) effect of power changes (torque);

(4) effect of yaw (sideslip);

(5) effect of disc loading (bank and flare);

(6) effect on controls of selecting hydraulics on/off;

(7) effect of control friction;

(8) use of instruments;

(9) operation of carburettor heat or anti-icing control.

(b) Air exercise: all long briefing objectives mentioned above should also be trained on site during the air exercise.

Exercise 5: Power and attitude changes

(a) Long briefing objectives:

(1) relationship between cyclic control position, disc attitude, fuselage attitude and air speed flap back;

(2) power required diagram in relation to air speed;

(3) power and air speed changes in level flight;

(4) use of the instruments for precision;

(5) engine and air speed limitations;

(b) Air exercise:

(1) relationship between cyclic control position, disc attitude, fuselage attitude and air speed flap back;

(2) power and air speed changes in level flight;

(3) use of instruments for precision (including instrument scan and look -out).

Exercise 6: Level flight, climbing, descending and turning

Note: for ease of training this exercise is divided into four separate parts in the PPL(H) syllabus but may be taught complete or in convenient parts.

(a) Long briefing objectives:

(1) basic factors involved in level flight;

(2) normal power settings;

(3) use of control friction or trim;

(4) importance of maintaining direction and balance;

(5) power required or power available diagram;

(6) optimum climb and descent speeds, angles or rates;

(7) importance of balance, attitude and co-ordination in the turn;

(8) effects of turning on rate of climb or descent;

(9) use of the gyro direction or heading indicator and compass;

(10) use of instruments for precision.

(b) Air exercises:

(1) maintaining straight and level flight at normal cruise power;

(2) control in pitch, including use of control friction or trim;

(3) use of the ball or yaw string to maintain direction and balance;

(4) setting and use of power for selected air speeds and speed changes;

(5) entry to climb;

(6) normal and maximum rate of climb;

(7) levelling off from climb at selected altitudes or heights;

(8) entry to descent;
(9) effect of power and air speed on rate of descent;
(10) levelling off from descent at selected altitudes or heights;
(11) entry to medium rate turns;
(12) importance of balance, attitude and co-ordination to maintain level turn;
(13) resuming straight and level flight;
(14) turns onto selected headings, use of direction indicator and compass;
(15) turns whilst climbing and descending;
(16) effect of turn on rate of climb or descent;
(17) use of instruments for precision (including instrument scan and look-out).

Exercise 7: Autorotation

(a) Long briefing objectives:
(1) characteristics of autorotation;
(2) safety checks (including look-out and verbal warning);
(3) entry and development of autorotation;
(4) effect of AUM, IAS, disc loading, G forces and density altitude on RRPM and rate of descent;
(5) rotor and engine limitations;
(6) control of air speed and RRPM;
(7) recovery to powered flight;
(8) throttle override and control of ERPM or RRPM during re-engagement (as applicable);
(9) danger of vortex condition during recovery.

(b) Air exercise:
(1) safety checks (including verbal warning and look-out);
(2) entry to and establishing in autorotation;
(3) effect of IAS and disc loading on RRPM and rate of descent;
(4) control of air speed and RRPM;
(5) recovery to powered flight;
(6) medium turns in autorotation;
(7) simulated engine off landing (as appropriate).

Exercise 8: Hovering and hover taxiing

(a) Long briefing objectives:
(1) ground effect and power required;
(2) effect of wind, attitude and surface;
(3) stability in hover and effects of over controlling;
(4) effect of control in hover;
(5) control and co-ordination during spot turns;
(6) requirement for slow hover speed to maintain ground effect;

(7) effect of hydraulic failure in hover;

(8) specific hazards, for example snow, dust, etc.

(b) Air exercise:

(1) ground effect and power or height relationship;

(2) effect of wind, attitude and surface;

(3) stability in hover and effects of over controlling;

(4) effect of control and hover technique;

(5) gentle forward running touchdown;

(6) control and co-ordination during spot (90 ° clearing) turns;

(7) control and co-ordination during hover taxi;

(8) dangers of mishandling and over pitching;

(9) (where applicable) effect of hydraulics failure in hover;

(10) simulated engine failure in the hover and hover taxi.

Exercise 9: Take-off and landing

(a) Long briefing objectives:

(1) pre take-off checks or drills;

(2) importance of good look-out;

(3) technique for lifting to hover;

(4) after take-off checks;

(5) danger of horizontal movement near ground;

(6) dangers of mishandling and over pitching;

(7) technique for landing;

(8) after landing checks;

(9) take-off and landing crosswind and downwind.

(b) Air exercise:

(1) pre take-off checks or drills:

(2) pre take-off look-out technique;

(3) lifting to hover;

(4) after take-off checks;

(5) landing;

(6) after landing checks or drills;

(7) take-off and landing crosswind and downwind.

Exercise 10: Transitions from hover to climb and approach to hover

(a) Long briefing objectives:

(1) revision of ground effect;

(2) translational lift and its effects;

(3) inflow roll and its effects;

(4) revision of flap back and its effects;

(5) avoidance of curve diagram and associated dangers;

(6) effect or dangers of wind speed and direction during transitions;

(7) transition to climb technique;

(8) constant angle approach;

(9) transition to hover technique.

(b) Air exercise:

(1) revision of take-off and landing;

(2) transition from hover to climb;

(3) effect of translational lift, inflow roll and flap back;

(4) constant angle approach;

(5) technique for transition from descent to hover;

(6) a variable flare simulated engine off landing.

Exercise 11: Circuit, approach and landing

(a) Long briefing objectives:

(1) circuit and associated procedures;

(2) take-off and climb (including checks or speeds);

(3) crosswind leg (including checks, speeds or angles of bank in turns);

(4) downwind leg (including pre-landing checks);

(5) base leg (including checks, speeds or angles of bank in turns);

(6) final approach (including checks or speeds);

(7) effect of wind on approach and hover IGE;

(8) crosswind approach and landing technique;

(9) missed approach and go-around technique (as applicable);

(10) steep approach technique (including danger of high sink rate);

(11) limited power approach technique (including danger of high speed at touchdown);

(12) use of the ground effect;

(13) abandoned take-off technique;

(14) hydraulic failure drills and hydraulics off landing technique (where applicable);

(15) drills or technique for tail rotor control or tail rotor drive failure;

(16) engine failure drills in the circuit to include;

(17) engine failure

(18) on take-off:

(i) crosswind;

(ii) downwind;

(iii) base leg;

(iv) on final approach.

(19) noise abatement procedures (as applicable).

(b) Air exercise:

(1) revision of transitions and constant angle approach;

(2) basic training circuit, including checks;

(3) crosswind approach and landing technique;

(4) missed approach and go-around technique (as applicable);

(5) steep approach technique;

(6) basic limited power approach or run on technique;

(7) use of ground effect;

(8) hydraulic failure and approach to touchdown with hydraulics off and to recover at safe height (as applicable);

(9) simulated engine failure on take-off, crosswind, downwind, base leg and finals;

(10) variable flare simulated engine off landing.

Exercise 12: First solo

(a) Long briefing objectives:

(1) warning of change of attitude due to reduced and laterally displaced weight;

(2) low tail, low skid or wheel during hover or landing;

(3) dangers of loss of RRPM and over pitching;

(4) pre take-off checks;

(5) into wind take-off;

(6) drills during and after take-off;

(7) normal circuit, approach and landing;

(8) action if an emergency.

(b) Air exercise: all long briefing objectives mentioned above should also be trained on site during the air exercise.

Exercise 13: Sideways and backwards hover manoeuvring

(a) Long briefing objectives:

(1) revision of hovering;

(2) directional stability and weather cocking effect;

(3) danger of pitching nose down on recovery from backwards manoeuvring;

(4) helicopter limitations for sideways and backwards manoeuvring;

(5) effect of CG position.

(b) Air exercise:

(1) revision of hovering and 90 ° clearing turns;

(2) manoeuvring sideways heading into wind;

(3) manoeuvring backwards heading into wind;

(4) manoeuvring sideways and backwards heading out of wind;

(5) manoeuvring backwards too fast and recovery action.

Exercise 14: Spot turns

(a) Long briefing objectives:

(1) revision of ground effect and effect of wind;

(2) weather cocking and control actions;

(3) control of RRPM;

(4) torque effect;

(5) cyclic limiting stops due to CG position (where applicable);

(6) rate of turn limitations;

(7) spot turn about pilot position;

(8) spot turn about tail rotor position;

(9) spot turn about helicopter geometric centre;

(10) square (safe visibility) and clearing turn.

(b) Air exercise:

(1) weather cocking, torque effect and control actions;

(2) rate of turn;

(3) spot turn about pilot position;

(4) spot turn about tail rotor position;

(5) spot turn about helicopter geometric centre;

(6) square and clearing turn.

Exercise 15: Hover out of ground effect and vortex ring

(a) Long briefing objectives:

(1) revision of ground effect and power required diagram;

(2) drift, height and power control, look-out or scan;

(3) vortex ring, (including dangers, recognition and recovery actions);

(4) loss of tail rotor effectiveness.

(b) Air exercise:

(1) to demonstrate hover OGE;

(2) drift, height, power control and look-out, and instrument scan technique;

(3) recognition of incipient stage of vortex ring and settling with power;

(4) recovery action from incipient stage of vortex ring;

(5) recognition of loss of tail rotor effectiveness and recovery actions.

Exercise 16: Simulated engine off landings

(a) Long briefing objectives:

(1) revision of basic autorotation;

(2) effect of AUM, disc loading, density altitude and RRPM decay;

(3) use of cyclic and collective to control speed or RRPM;

(4) torque effect;

(5) use of flare or turn to restore RRPM;

(6) technique for variable flare simulated EOL;

(7) technique for constant attitude simulated EOL;

(8) revision of technique for hover or hover taxi simulated EOL;

(9) emergency technique for engine failure during transition;

(10) technique for low level simulated EOL.

(b) Air exercise

(1) revision of entry to and control in autorotation;

(2) variable flare simulated EOL

(3) constant attitude simulated EOL;

(4) hover simulated EOL;

(5) hover taxi simulated EOL;

(6) low level simulated EOL.

Exercise 17: Advanced autorotations

(a) Long briefing objectives:

(1) effect of air speed or AUM on angles or rates of descent

(2) effect of RRPM setting on angle or rate of descent;

(3) reason and technique for range autorotation;

(4) reason and technique for constant attitude autorotation;

(5) reason and technique for low speed and ‘S’ turns in autorotation;

(6) speed or bank limitations in turns in autorotation;

(7) revision of re-engagement or go-around procedures.

(b) Air exercise:

(1) selection of ground marker and standard datum height to determine distance covered during various autorotation techniques;

(2) revision of basic autorotation;

(3) technique for range autorotation;

(4) technique for constant attitude autorotation;

(5) technique for low speed autorotation, including need for timely speed recovery;

(6) technique for ‘S’ turn in autorotation;

(7) 180 and 360 ° turns in autorotation;

(8) revision of re-engagement and go-around technique.

Exercise 18: Practice forced landings

(a) Long briefing objectives:

(1) types of terrain or surface options for choice of best landing area;

(2) practice forced landing procedure;

(3) forced landing checks and crash actions;

(4) rules or height for recovery and go-around.

(b) Air exercise:

(1) recognition of types of terrain from normal cruise height or altitude;

(2) practice forced landing technique;

(3) revision of recovery or go-around technique.

Exercise 19: Steep turns

(a) Long briefing objectives:

(1) air speed or angle of bank limitations;

(2) technique for co-ordination to hold bank or attitude;

(3) revision of speed or bank limitations in autorotation including RRPM control;

(4) significance of disc loading, vibration and control feedback;

(5) effect of wind in turns at low level.

(b) Air exercise:

(1) technique for turning at 30 ° of bank;

(2) technique for turning at 45 ° of bank (where possible);

(3) steep autorotative turns;

(4) explanation of faults in the turn: balance, attitude, bank and co-ordination;

(5) effect of wind at low level.

Exercise 20: Transitions

(a) Long briefing objectives:

(1) revision of effect of ground cushion, translational lift and flap back;

(2) training requirement for precision exercise;

(3) technique for transition to forward flight and back to hover as precision exercise;

(4) effect of wind.

(b) Air exercise:

(1) transition from hover to minimum 50 knots IAS and back to hover; Note: select constant height (20 - 30 ft) and maintain.

(2) effect of wind.

Exercise 21: Quick stops

(a) Long briefing objectives:

(1) power control co-ordination;

(2) revision of effect of wind;

(3) technique for quick stop into wind;

(4) technique for quick stop from crosswind;

(5) revision of air speed and angles of bank limitations;

(6) technique for emergency turn from downwind;

(7) technique for quick stop from downwind from high speed: flare and turn;

(8) technique for quick stop from downwind from low speed: turn and flare;

(9) Note: use reasonable datum speed for example high speed, low speed.

(10) danger of holding flare when downwind, (vortex ring) - (minimum speed 70 knots);

(11) to revise danger of high disc loading.

(b) Air exercise:

(1) technique for quick stop into wind;

(2) technique for quick stop from crosswind;

(3) danger of vortex ring and disc loading;

(4) technique for quick stop from downwind with low speed;

(5) technique for quick stop from downwind with high speed;

(6) emergency turns from downwind.

Exercise 22: Navigation

Long briefing objectives:

Note: to be broken down into manageable parts at discretion of instructor.

(1) flight planning:

(i) weather forecasts and actuals;

(ii) map selection, orientation, preparation and use:

(A) choice of route;

(B) regulated or controlled airspace;

(C) danger, prohibited and restricted areas;

(D) safety altitude.

(iii) calculations:

(A) magnetic heading(s), time(s) en route;

(B) fuel consumption;

(C) mass and balance.

(iv) flight information:

(A) NOTAMs etc;

(B) noting of required radio frequencies;

(C) selection of alternate landing sites.

(v) helicopter documentation;

(vi) notification of the flight:

(A) pre-flight administration procedures;

(B) flight plan form (where appropriate).

(2) departure:

(i) organisation of cockpit workload;

(ii) departure procedures:

(A) altimeter settings;

(B) ATC liaison in controlled or regulated airspace;

(C) setting heading procedure;

(D) noting of ETA(s);

(E) maintenance of height or altitude and heading.

(iii) procedure for revisions of ETA and headings to include:

(A) 10 ° line, double track, track error and closing angle;

(B) 1 in 60 rule;

(iv) amending an ETA;

(v) log keeping;

(vi) use of radio;

(vii) use of navaids;

(viii) weather monitoring and minimum weather conditions for continuation of flight;

(ix) significance of in-flight decision making;

(x) technique for transiting controlled or regulated airspace;

(xi) uncertainty of position procedure;

(xii) lost procedure.

(3) arrival:

(i) aerodrome joining procedure, in particular ATC liaison in controlled or regulated airspace:

(A) altimeter setting;

(B) entering traffic pattern;

(C) circuit procedures.

(ii) parking procedures, in particular:

(A) security of helicopter;

(B) refuelling;

(C) closing of flight plan, (if appropriate);

(D) post flight administrative procedures.

(4) navigation problems at low heights and reduced visibility:

(i) actions before descending;

(ii) significance of hazards, (for example obstacles and other traffic);

(iii) difficulties of map reading;

(iv) effects of wind and turbulence;

(v) significance of avoiding noise sensitive areas;

(vi) procedures for joining a circuit from low level;

(vii) procedures for a bad weather circuit and landing;

(viii) actions in the event of encountering DVE;

(ix) appropriate procedures and choice of landing area for precautionary landings;

(x) decision to divert or conduct precautionary landing;

(xi) precautionary landing.

(5) radio navigation:

(i) use of VOR:

(A) availability, AIP and frequencies;

(B) selection and identification;

(C) use of OBS;

(D) to or from indications: orientation;

(E) use of CDI;

(F) determination of radial;

(G) intercepting and maintaining a radial;

(H) VOR passage;

(I) obtaining a fix from two VORs.

(ii) use of ADF equipment:

(A) availability of NDB stations, AIP and frequencies;

(B) selection and identification;

(C) orientation relative to beacon;

(D) homing.

(iii) use of VHF/DF

(A) availability, AIP and frequencies;

(B) R/T procedures and ATC liaison;

(C) obtaining a QDM and homing.

(iv) use of en-route or terminal radar:

(A) availability and AIP;

(B) procedures and ATC liaison;

(C) pilots responsibilities;

(D) secondary surveillance radar:

(a) transponders;

(b) code selection;

(E) interrogation and reply.

(v) use of DME:

(A) station selection and identification;

(B) modes of operation: distance, groundspeed and time to run.

(vi) use of GNSS:

(P) selection of waypoints;

(Q) to or from indications and orientation;

(R) error messages;

(S) hazards of over-reliance in the continuation of flight in DVE.

Air exercise:

(1) navigation procedures as necessary;

(2) to advise student and correct errors as necessary;

(3) map reading techniques;

(4) the significance of calculations;

(5) revision of headings and ETA's;

(6) use of radio;

(7) use of navaids: ADF/NDB, VOR, VHF/DF, DME and transponder;

(8) cross-country flying by using visual reference, DR, GNNS and, where available, radio navigation aids; simulation of deteriorating weather conditions and actions to divert or conduct precautionary landing;

(9) log keeping;

(10) importance of decision making;

(11) procedure to deal with uncertainty of position;

(12) lost procedure;

(13) appropriate procedures and choice of landing area for precautionary landings;

(14) aerodrome joining procedure;

(15) parking and shut-down procedures;

(16) post-flight administration procedures.

Exercise 23: Advanced take-off, landings and transitions

Long briefing objectives:

(1) revision of landing and take-off out of wind (performance reduction);

(2) revision of wind limitations;

(3) revision of directional stability variation when out of wind;

(4) revision of power required diagram;

(5) technique for vertical take-off over obstacles;

(6) technique for downwind transitions;

(7) reconnaissance technique for landing site;

(8) power checks;

(9) technique for running landing;

(10) technique for zero speed landing;

(11) technique for crosswind and downwind landings;

(12) steep approach, including dangers;

(13) revision of go-around procedures.

Air exercise

(1) technique for downwind transition;

(2) technique for vertical take-off over obstacles;

(3) reconnaissance technique for landing site;

(4) power check and assessment;

(5) technique for running landing;

(6) technique for zero speed landing;

(7) technique for crosswind and downwind landings;

(8) technique for steep approach;

(9) go-around procedures.

Exercise 24: Sloping ground

(a) Long briefing objectives:

(1) limitations;

(2) wind and slope relationship, including blade and control stops;

(3) effect of CG when on slope;

(4) ground effect and power required when on slope;

(5) landing technique when on slope, left, right and nose-up;

(6) avoidance of dynamic rollover, dangers of soft ground and sideways movement;

(7) dangers of over controlling near ground on slope;

(8) danger of striking main or tail rotor on up slope.

(b) Air exercise

(1) technique for assessing slope angle;

(2) technique for landing and take-off left skid up slope;

(3) technique for landing and take-off right skid up slope;

(4) technique for landing nose up slope;

(5) dangers of over controlling near ground.

Exercise 25: Limited power

(a) Long briefing objectives:

(1) use of appropriate helicopter performance graphs;

(2) selection of technique according to available power;

(3) effect of wind on available power.

(b) Air exercise: to revise and refine techniques demonstrated in exercise 23.

Exercise 26: Confined areas

(a) Long briefing objectives:

(1) revision of use of helicopter performance graphs;

(2) procedure for locating landing site and selecting site marker;

(3) procedures for assessing wind speed and direction;

(4) landing site reconnaissance techniques;

(5) reason for selecting landing markers;

(6) procedure for selecting direction and type of approach;

(7) dangers of out of wind approach;

(8) circuit procedures;

(9) reason for approach to committal point and go-around, (practice approach);

(10) approach technique;

(11) revision of clearing turn and landing (sloping ground technique);

(12) hover power check or performance assessment IGE and OGE (if necessary);

(13) take-off procedures.

(b) Air exercise

(1) procedures for locating landing site and selecting site marker;

(2) procedures for assessing wind speed and direction;

(3) landing site reconnaissance techniques;

(4) selecting landing markers, direction and type of approach;

(5) circuit procedure;

(6) practice approach, go-around and approach technique;

(7) revision of clearing turn and landing (sloping ground technique);

(8) hover power check or performance assessment IGE and OGE (if necessary);

(9) take-off procedures.

Exercise 27: Basic instrument flight

(a) Long briefing objectives:

(1) physiological sensations;

(2) instrument appreciation;

(3) attitude instrument flight;

(4) instrument scan;

(5) instrument limitations;

(6) basic manoeuvres by sole reference to instruments:

(i) straight and level flight at various air speeds and configurations;

(ii) climbing and descending;

(iii) standard rate turns, climbing and descending, onto selected headings;

(iv) recoveries from climbing and descending turns (unusual attitudes).

(b) Air exercise:

(1) attitude instrument flight and instrument scan;

(2) basic manoeuvres by sole reference to instruments:

(i) straight and level flight at various air speeds and configurations;

(ii) climbing and descending;

(iii) standard rate turns, climbing and descending, onto selected headings;

(iv) recoveries from climbing and descending turns (unusual attitudes).

Exercise 28: Night flying (if night instructional qualification required)

(a) Long briefing objectives:

(1) medical or physiological aspects of night vision;

(2) requirement for torch to be carried (pre-flight inspection, etc.);

(3) use of the landing light;

(4) take-off and hover taxi procedures at night;

(5) night take-off procedure;

(6) cockpit procedures at night;

(7) approach techniques;

(8) night landing techniques;

(9) night autorotation techniques (power recovery at safe height);

(10) technique for practice forced landing at night (using appropriate illumination);

(11) emergency procedures at night;

(12) navigation principles at night;

(13) map marking for night use (highlighting built up or lit areas with thicker lines, etc.).

(b) Air exercise:

(1) use of torch for pre-flight inspection;

(2) use of landing light;

(3) night take-off to hover (no sideways or backwards movement);

(4) night hover taxi (higher and slower than by day);

(5) night transition procedure;

(6) night circuit;

(7) night approach and landing (including use of landing light);

(8) night autorotation (power recovery at safe height);

(9) practice forced landing at night (using appropriate illumination);

(10) night emergency procedures;

(11) night cross country techniques, as appropriate.

C. Airships

Part 2

Air exercises

(a) The air exercises are similar to those used for the training of PPL(As) but with additional items designed to cover the needs of an FI.

(b) 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:

(1) the applicant's progress and ability;

(2) the weather conditions affecting the flight;

(3) the flight time available;

(4) instructional technique considerations;

(5) the local operating environment.

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

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 about who is to fly the airship 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.

The four basic components of the briefing will be:

(1) the aim;

(2) principles of flight (briefest reference only);

(3) the air exercise(s) (what, and how and by whom);

(4) airmanship (weather, flight safety etc.).

Planning of flight lessons

The preparation of lesson plans is an essential prerequisite 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

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

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

It is to be noted that airmanship and look-out is a vital ingredient of all flight operations. Therefore, in the following air exercises the relevant aspects of airmanship are to be stressed at all times.

The exercises 15 and 16 of the flight instruction syllabus should be undertaken at night in addition to by day as part of the course.

The student instructor should learn how to identify common errors and how to correct them properly, which should be emphasised at all times.

Syllabus of flight instruction contents

Long briefings and air exercises

Note: although exercise 16 is not required for the PPL(As) course it is a requirement for the FI(As) course.

Exercise 1: Familiarisation with the airship

(a) Long briefing objectives:

(1) introduction to the airship;

(2) characteristics of the airship;

(3) cockpit layout;

(4) airship and engine systems;

(5) use of the checklist(s) and procedures;

(6) to familiarise the student with the airship controls;

(7) differences when occupying the instructor's seat;

(8) emergency drills:

(i) action if fire in the air or on the ground: engine, cockpit or cabin and electrical fire;

(ii) system failure drills as applicable to type;

(iii) escape drills: location and use of emergency equipment and exits.

(b) Air exercise: all long briefing objectives mentioned above should also be trained on site during the air exercise.

Exercise 2: Preparation for and action after flight

(a) Long briefing objectives:

(1) flight authorisation and airship acceptance including tech log (if applicable) and certificate of maintenance;

(2) equipment required for flight (maps, etc.);

(3) external checks;

(4) internal checks;

(5) student comfort, harness, seat and rudder pedal adjustment;

(6) starting and after starting checks;

(7) system, power or serviceability checks (as applicable);

(8) closing down or shutting down the airship (including system checks);

(9) parking, masting and unmasting, leaving the airship (including safety or security as applicable);

(10) completion of the authorisation sheet and airship serviceability documents;

(b) Air exercise: all long briefing objectives mentioned above should also be trained on site during the air exercise.

Exercise 3: Air experience

(a) Long briefing objectives:

Note: there is no requirement for a long briefing for this exercise.

(b) Air exercise:

(1) air experience;

(2) cockpit layout, ergonomics and controls;

(3) cockpit procedures: stability and control.

Exercise 4: Effects of controls

(a) Long briefing objectives:

(1) function of the flying controls (primary and secondary effect);

(2) effect of air speed;

(3) effect of power changes;

(4) effect of trimming and other controls;

(5) use of instruments;

(6) use of carburettor heat.

(b) Air exercise:

(1) function of the flying controls;

(2) effect of air speed;

(3) effect of power changes;

(4) effect of trimming and other controls;

(5) use of instruments (including instrument scan);

(6) use of carburettor heat.

Exercise 5: Ground manoeuvering

(a) Long briefing objectives:

(1) pre-taxi checks;

(2) starting, control of speed and stopping;

(3) engine handling;

(4) masting procedures;

(5) control of direction and turning;

(6) effects of wind;

(7) effects of ground surface;

(8) marshalling signals;

(9) instrument checks;

(10) ATC procedures;

(11) emergencies.

(b) Air exercise:

(1) starting, control of speed and stopping;

(2) engine handling;

(3) masting procedures;

(4) control of direction and turning;

(5) effect of wind.

Exercise 6: Take-off procedures

(a) Long briefing objectives:

(1) pre take-off checks;

(2) take-off with different static heaviness;

(3) drills during and after take-off;

(4) noise abatement procedures.

(b) Air exercise:

(1) take-off with different static heaviness;

(2) drills during and after take-off.

Exercise 6e: Emergencies

(a) Long briefing objectives:

(1) abandoned take-off;

(2) engine failures and actions after take-off;

(3) malfunctions of thrust vector control;

(4) aerodynamic control failures;

(5) electrical and system failures.

(b) Air exercise:

(1) how to abandon a take-off;

(2) engine failure and suitable action;

(3) malfunctions of thrust vector control;

(4) aerodynamic control failures.

Exercise 7: Climbing

(a) Long briefing objectives:

(1) entry and how to maintain the normal and max rate of climb;

(2) levelling off procedure;

(3) how to level off at selected altitudes;

(4) maximum angle of climb;

(5) maximum rate of climb.

(b) Air exercise:

(1) how to level off at selected altitudes;

(2) maximum angle of climb.

Exercise 8: Straight and level flight

(a) Long briefing objectives:

(1) how to attain and maintain straight and level flight;

(2) flight at or close to pressure height;

(3) control in pitch, including use of trim;

(4) at selected air speeds (use of power);

(5) during speed changes;

(6) use of instruments for precision.

(b) Air exercise:

(1) how to attain and maintain straight and level flight;

(2) flight at or close to pressure height;

(3) control in pitch, including use of trim;

(4) at selected air speeds (use of power);

(5) during speed changes.

Exercise 9: Descending

(a) Long briefing objectives:

(1) entry, maintaining and levelling off techniques;

(2) levelling off at selected altitudes;

(3) maximum rate of descent;

(4) maximum angle of descent;

(5) use of instruments for precision flight.

(b) Air exercise:

(1) levelling off at selected altitudes;

(2) maximum rate of descent;

(3) maximum angle of descent.

Exercise 10: Turning

(a) Long briefing objectives:

(1) entry and maintaining level turns;

(2) resuming straight flight;

(3) faults in the turn;

(4) climbing turns;

(5) descending turns;

(6) turns to selected headings: use of gyro heading indicator and compass;

(7) use of instruments for precision.

(b) Air exercise

(1) faults in the turn and correction techniques;

(2) climbing turns;

(3) descending turns.

Exercise 11: Hovering

(a) Long briefing objectives: hovering manoeuvres (as applicable).

(b) Air exercise: hovering manoeuvres (as applicable).

Exercise 12: Approach and landing

(a) Long briefing objectives:

(1) effect of wind on approach and touchdown speeds;

(2) landing with different static heaviness;

(3) missed approach and go-around procedures;

(4) noise abatement procedures.

(b) Air exercise

(1) a landing with different static heaviness;

(2) missed approach and go-around procedures.

Exercise 12e: Emergencies

(a) Long briefing objectives:

(1) aborted approach or go-around;

(2) malfunction of thrust vector control;

(3) envelope emergencies;

(4) fire emergencies;

(5) aerodynamic control failures;

(6) electrical and system failures.

(b) Air exercise: emergency drills and actions.

Exercise 13: Precautionary landing

(a) Long briefing objectives:

(1) occasions necessitating a precautionary landing;

(2) in-flight conditions;

(3) landing area selection;

(4) circuit and approach.

(b) Air exercise:

(1) how to perform the landing area selection;

(2) circuit and approach.

Exercise 14a: Navigation

(a) Long briefing objectives:

(1) how to do the flight planning;

(2) departure for a navigation flight;

(3) in-flight navigational techniques;

(4) arrival and aerodrome joining procedures;

(b) Air exercise:

(1) complete flight planning of a navigation flight;

(2) departure for a navigation flight;

(3) in-flight navigational techniques;

(4) arrival and aerodrome joining procedures.

Exercise 14b: Navigation at lower levels and in reduced visibility

(a) Long briefing objectives:

(1) actions before descending;

(2) possible hazards (for example obstacles and terrain) and actions;

(3) student difficulties of map reading;

(4) effects of winds, turbulence and precipitation;

(5) vertical situational awareness;

(6) avoidance of noise sensitive areas;

(7) joining the circuit;

(8) bad weather circuit and landing.

(b) Air exercise:

(1) actions before descending;

(2) map reading techniques;

(3) vertical situational awareness;

(4) avoidance of noise sensitive areas;

(5) joining the circuit;

(6) bad weather circuit and landing.

Exercise 14c: Radio navigation

(a) Long briefing objectives:

(1) use of VOR;

(2) use of ADF equipment;

(3) use of NDB stations;

(4) use of VHF/DF;

(5) use of en-route or terminal radar;

(6) use of DME equipment.

(b) Air exercise

(1) use of navaids;

(2) procedure to deal with uncertainty of position.

Exercise 15: Basic instrument flight

(a) Long briefing objectives:

(1) physiological sensations;

(2) instrument appreciation;

(3) attitude instrument flight;

(4) instrument scan;

(5) instrument limitations;

(6) basic manoeuvres by sole reference to the instruments:

(i) straight and level;

(ii) climbing and descending;

(iii) turns, climbing and descending, onto selected headings;

(iv) recoveries from climbing and descending turns.

(b) Air exercise:

(1) attitude instrument flight and instrument scan;

(2) the basic manoeuvres:

(i) straight and level;

(ii) climbing and descending;

(iii) turns, climbing and descending, onto selected headings;

(iv) recoveries from climbing and descending turns.

Exercise 16: night flying (if night instructional qualification required)

(a) Long briefing objectives:

(1) medical and physiological aspects of night vision;

(2) requirement for torch to be carried (pre-flight inspection, etc.);

(3) use of the landing light;

(4) ground manoeuvring procedures at night;

(5) night take-off procedure;

(6) cockpit procedures at night;

(7) approach techniques;

(8) night landing techniques

(9) emergency procedures at night;

(10) navigation principles at night.

(b) Air exercise:

(1) use of landing light;

(2) night ground manoeuvring;

(3) night take-off, circuit or approach and landing (including use of landing light).

AMC2 FCL.930.FI FI Training course

FI(S) and FI(B) training course

General

(a) The aim of the FI(S) and FI(B) training course is to train SPL and BPL holders to the level of competence defined in FCL.920 as instructor competencies.

(b) The training course should develop safety awareness throughout by teaching the knowledge, skills and attitudes relevant to the FI task including at least the following:

(1) refresh the technical knowledge of the student instructor;

(2) train the student instructor to teach the ground subjects and air exercises;

(3) ensure that the student instructor's flying is of a sufficiently high standard; and

(4) teach the student instructor the principles of basic instruction and to apply them at all training levels.

(c) With the exception of the section on teaching and learning, all the subject detail contained in the ground and flight training syllabus is complementary to the SPL and BPL course syllabus.

(d) The FI training course should give particular stress to the role of the individual in relation to the importance of human factors in the man-machine and theoretical knowledge environment interaction. Special attention should be paid to the applicant's maturity and judgement including an understanding of adults, their behavioural attitudes and variable levels of education.

(e) During the training course, the applicants should be made aware of their own attitudes to the importance of flight safety. Improving safety awareness should be a fundamental objective throughout the training course. It will be of major importance for the training course to aim at giving applicants the knowledge, skills and attitudes relevant to a flight instructor's task.

(f) On successful completion of the training course and final test the applicant may be issued with an FI certificate.

Content

(g) The training course consists of two parts:

(1) Part 1, theoretical knowledge including the teaching and learning instruction that should comply with AMC1 FCL.920;

(2) Part 2, flight instruction.

Part 1

The content of the teaching and learning part of the FI course, as established in AMC1 FCL.930.FI, should be used as guidance to develop the course syllabus.

The course should include at least 55 hours of theoretical knowledge including at least 25 hours teaching and learning instructions for the FI (S) and FI(B) certificate.

Part 2

Flight instruction syllabus

An approved FI training course should comprise at least the minimum hours of flight instruction as defined in FCL.930.FI.

Air exercises

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

(b) 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:

(1) the applicant's progress and ability;

(2) the weather conditions affecting the flight;

(3) the flight time available;

(4) instructional technique considerations;

(5) the local operating environment;

(6) Applicability of the exercises to the aircraft type.

(c) At the discretion of the instructors some of the exercises may be combined whereas some other exercises may be done in several flights.

(d) It follows that student instructors will eventually be faced with similar inter -related 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

(e) 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 aircraft 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.

(f) The five basic components of the briefing will be:

(1) the aim;

(2) the air exercise(s) (what, and how and by whom);

(3) flight briefing;

(4) check of understanding;

(5) airmanship.

Planning of flight lessons

(g) The preparation of lesson plans is an essential prerequisite 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

(h) The student instructor should complete flight training in order to practise the principles of basic instruction at the SPL or BPL level. During this training the student instructor occupies the seat normally occupied by the FI.

(i) The instructor providing this instructor training is normally taking over the role of the student pilot. In the case of the course for the FI(B) an additional person holding a BPL or LAPL(B) licence or a student pilot for these licences may be on board in order to function as a student pilot under the supervision of the instructor.

(j) 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.

(k) The student instructor should learn how to identify common errors and how to correct them properly, which should be emphasised at all times.

Syllabus of flight instruction contents

A. Sailplanes

Long briefings and air exercises

Note: although the fully developed spin in exercise 10 is not required for the LAPL course, it is a requirement for the FI course.

Exercise 1: Familiarisation with the sailplane

(a) Objective:

To advise the student instructor on how to familiarise the student with the sailplane which will be used for the training and to test his/her position in the sailplane for comfort, visibility, and ability to use all controls and equipment.

(b) Briefing and exercise:

The student Instructor has to:

(1) present the type of sailplane which will be used;

(2) explain the cockpit layout: instruments and equipment;

(3) explain the flight controls: stick, pedals, airbrakes, flaps, cable release, undercarriage;

(4) check the position of the student on the seat for comfort, visibility, ability to use all controls;

(5) explain the use of the harness;

(6) demonstrate how to adjust the rudder pedal;

(7) explain the differences when occupying the instructor's position;

(8) explain all checklists, drills, controls.

Exercise 2: Procedure in the event of emergencies

(a) Objective:

To advise the student instructor on how to familiarise the student with the use of the parachute and how to explain the bailout procedure in case of emergency.

(b) Briefing and exercise:

The student instructor has to:

(1) explain how to handle the parachute with care (transport, storage and drying after use);

(2) demonstrate the adjustment of the parachute harness;

(3) explain the bailout procedure (especially from a sailplane in unusual attitude);

(4) explain the procedure for landing with a parachute in normal conditions and with a strong wind.

Exercise 3: Preparation for flight

(a) Objective:

To advise the student instructor on how to explain all the operations to be completed prior to flight. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the need for a pre-flight briefing;

(2) the structure and the content of this briefing;

(3) which documents are required on board;

(4) which equipment are required for a flight;

(5) how to handle the sailplane on the ground, how to move it, how to tow it out and how to park it;

(6) how to do the pre-flight external and internal checks;

(7) the procedure for verifying in-limits mass and balance;

(8) the pre-launch checks (checklist).

(c) Air exercise:

The student instructor has to demonstrate:

(1) the need for a pre-flight briefing;

(2) that the required documents are on board;

(3) that the equipment required for the intended flight is on board;

(4) how to handle the sailplane on the ground, move it to the start position, tow it out and park it;

(5) how to perform a pre-flight external and internal check;

(6) how to verify in-limits mass and balance;

(7) how to adjust harness as well as seat or rudder pedals;

(8) the pre-launch checks;

(9) how to advise the student pilot in performing the pre-flight preparation;

(10) how to analyse and correct pre-flight preparation errors as necessary.

Exercise 4: Initial air experience

(a) Objective:

To advise the student instructor on how to familiarise the student with being in the air, with the area around the airfield, to note his/her reactions in this situation, and to draw his/her attention to safety and look-out procedures.

(b) Briefing:

The student instructor has to explain:

(1) the area around the airfield;

(2) the need for looking out;

(3) the change of aircraft control.

(c) Air exercise:

The student instructor has to:

(1) show the noteworthy references on the ground;

(2) analyse the reactions of the student;

(3) check that the student looks out (safety).

Exercise 5: Primary effects of controls

(a) Objective:

To advise the student instructor on how to:

(1) demonstrate the primary effects of each control with the help of visual references;

(2) train the student pilot to recognise when the sailplane is no longer in a normal attitude along one of the axes and to return to the normal attitude;

(3) train continuous and efficient look-out during these exercises;

(4) analyse and correct errors and student pilot mistakes as necessary.

(b) Briefing:

The student instructor has to explain:

(1) define the axes of a sailplane;

(2) the look-out procedures;

(3) the visual references along each axis;

(4) the primary effects of controls when laterally level;

(5) the relationship between attitude and speed;

(6) the use of flaps;

(7) the use of airbrakes.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the visual references in flight;

(2) the primary effect of the elevator;

(3) the relationship between attitude and speed (inertia);

(4) the primary effect of rudder on the rotation of the sailplane around the vertical axis;

(5) the primary effect of ailerons on banking;

(6) the effect of airbrakes (including changes in pitch when airbrakes are extended or retracted);

(7) the effects of flaps (provided the sailplane has flaps);

(8) the look-out procedures during all the exercises;

(9) how to advise the student pilot to recognise the primary effects of each control;

(10) how to analyse and correct errors as necessary.

Exercise 6: Co-ordinated rolling to and from moderate angles of bank

(a) Objective:

To advise the student instructor on secondary effects of controls and on how to teach the student to coordinate ailerons and rudder in order to compensate for the adverse yaw effect. Furthermore the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the secondary effects of controls;

(2) the adverse yaw effect;

(3) how to compensate for the adverse yaw;

(4) the further effect of the rudder (roll).

(c) Air exercise:

The student instructor has to demonstrate:

(1) the adverse yaw effect with a reference on ground;

(2) the further effect of the rudder (roll);

(3) the coordination of ruder and aileron controls to compensate for the adverse yaw effects;

(4) rolling to and from moderate angles of bank (20 to 30°) and returning to the straight flight;

(5) how to advise the student pilot to coordinate ailerons and rudder;

(6) how to analyse and correct errors as necessary.

Exercise 7: Straight flying

(a) Objective:

To advise the student instructor on how to train the student to maintain straight flight with a constant heading without slipping and skidding. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to:

(1) explain how to maintain straight flight;

(2) explain different air speed limitations;

(3) explain the pitch stability of the sailplane;

(4) explain the effect of trimming.

(c) Air exercise:

The instructor student has to demonstrate:

(1) maintaining straight flight;

(2) inherent pitch stability;

(3) the control of the sailplane in pitch, including use of trim with visual references and speed;

(4) how to perform the instrument monitoring;

(5) the control of level attitude with visual references;

(6) the control of the heading with a visual reference on the ground;

(7) the look-out procedures during all the exercises;

(8) how to advise the student pilot to maintain straight flight;

(9) how to analyse and correct errors as necessary.

Exercise 8: Turning

(a) Objective:

To advise the student instructor on how to teach students to fly turns and circles with a moderate constant bank of about 30° with constant attitude (speed) and coordinated flight. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the forces on the sailplane during a turn;

(2) the need to look out before turning;

(3) the sequences of a turn (entry, stabilizing and exiting);

(4) the common faults during a turn;

(5) how to turn on to selected headings, use of compass;

(6) the use of instruments (ball indicator or slip string) for precision.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the look-out procedure before turning;

(2) entering a turn (correction of adverse yaw);

(3) the stabilisation of a turn (keeping the attitude and compensating the induced roll);

(4) the exit from a turn;

(5) the most common faults in a turn;

(6) turns on to selected headings (use landmarks as reference);

(7) use of instruments (ball indicator or slip string) for precision:

(8) how to advise the student pilot to fly a turn or circle with a moderate bank;

(9) how to analyse and correct errors as necessary.

Exercise 9a: Slow flight

(a) Objective:

To advise the student instructor on how to improve the student's ability to recognise inadvertent flight at critically low speeds (high angle of attack) and to provide practice in maintaining the sailplane in balance while returning to normal attitude (speed). Furthermore the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the characteristics of slow flight;

(2) the risks of stalling.

(c) Air Exercise:

The student instructor has to check that the airspace below the sailplane is free of other aircraft before starting the exercise.

The student instructor has to demonstrate:

(1) a controlled flight down to critically high angle of attack (slow air speed), and draw the attention of the student to the nose up attitude, reduction of noise, reduction of speed;

(2) a return to the normal attitude (speed);

(3) how to advise the student pilot to recognise inadvertent flight at critically low speeds;

(4) how to provide practice in maintaining the sailplane in balance while returning to normal attitude;

(5) how to analyse and correct errors as necessary.

Exercise 9b: Stalling

(a) Objective:

To advise the student Instructor on how to improve the student's ability to recognize a stall and to recover from it. This includes stall from a level flight and stalls when a wing drops. Furthermore the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the mechanism of a stall;

(2) the effectiveness of the controls at the stall;

(3) pre-stall symptoms, recognition and recovery;

(4) factors affecting the stall (importance of the angle of attack and high speed stall);

(5) effect of flaps if any on the sailplane;

(6) the effects of unbalance at the stall safety checks;

(7) stall symptoms, recognition and recovery;

(8) recovery when a wing drops;

(9) approach to stall in the approach and in the landing configurations: recognition and recovery from accelerated stalls.

(c) Air Exercise:

The student instructor has to check that the airspace below the sailplane is free of other aircraft or traffic before starting the exercise.

The student instructor has to demonstrate:

(1) stall from a level flight;

(2) pre-stall symptoms, recognition and recovery;

(3) stall symptoms, recognition and recovery;

(4) recovery when a wing drops;

(5) approach to stall in the approach and in the landing configurations;

(6) recognition and recovery from accelerated stalls;

(7) stalling and recovery at the incipient stage with 'instructor induced' distractions;

(8) how to improve the student pilot's ability to recognise a stall and to recover from it;

(9) how to analyse and correct errors as necessary.

Note: consideration is to be given to manoeuvre limitations and references to the flight manual or equivalent document (for example owner's manual or pilot's operating handbook) in relation to mass and balance limitations. The safety checks should take into account the minimum safe altitude for initiating such exercises in order to ensure an adequate margin of safety for the recovery. If specific procedures for stalling or spinning

exercises and for the recovery techniques are provided by the flight manual or equivalent document (for example owner's manual or pilot's operating handbook), they have to be taken into consideration. These factors are also covered in the next exercise.

Exercise 10a: Spin recognition and avoidance

(a) Objective:

To advise the student Instructor on how to improve the student's ability to recognize a spin at the incipient stage and to recover from it. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) why a sailplane spins;

(2) how to recognise the symptoms of a spin (not to be confused with spiral dive);

(3) what are the parameters influencing the spin;

(4) how to recover from a spin.

(c) Air exercise:

The student instructor has to check that the airspace below the sailplane is free of other aircraft or traffic before starting the exercise.

The student instructor has to:

(1) demonstrate stalling and recovery at the incipient spin stage (stall with excessive wing drop, about 45 °);

(2) make sure that the student recognises the spin entry;

(3) make sure that the student pilot is able to recover from the spin;

(4) check if the student still reacts properly if the instructor induces distractions during the spin entry;

(5) demonstrate how to analyse and correct errors as necessary.

Note: consideration of manoeuvre limitations and the need to refer to the sailplane manual and mass and balance calculations.

Exercise 10b: Developed spins: entry and recovery

(a) Objective:

To advise the student instructor on how to recognize a developed spin and to recover from it. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the spin entry;

(2) the symptoms of a real spin and the recognition and identification of spin direction;

(3) the spin recovery;

(4) use of controls;

(5) effects of flaps (flap restriction applicable to type);

(6) the effect of the CG upon spinning characteristics;

(7) the spinning from various flight attitudes;

(8) the sailplane limitations;

(9) safety checks;

(10) common errors during recovery.

(c) Air exercise:

The student instructor has to check that the airspace below the sailplane is free of other aircraft or traffic before starting the exercise.

The student instructor has to demonstrate:

(1) safety checks;

(2) the spin entry;

(3) the recognition and identification of the spin direction;

(4) the spin recovery (reference to flight manual);

(5) the use of controls;

(6) the effects of flaps (restrictions applicable to sailplane type);

(7) spinning and recovery from various flight attitudes;

(8) how to improve the student pilot's ability to recognise a spin and how to recover from it;

(9) how to analyse and correct errors as necessary.

Exercise 11: Take off or launch methods

Note: the student instructor has to teach at least one of the following launch methods: winch launch, aero tow, self-launch. At least three launch failure exercises should be completed. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

Exercise 11a: Winch launch

(a) Objective:

To advise the student instructor on how to teach winch launches and on how to make sure that their student will manage an aborted launch. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the signals or communication before and during launch;

(2) the use of the launching equipment;

(3) the pre-take-off checks;

(4) the procedure for into wind take-off;

(5) the procedure for crosswind take-off;

(6) the optimum profile of winch launch and limitations;

(7) the launch failure procedures.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the use of the launching equipment;

(2) the pre-take-off checks;

(3) the into wind take-off;

(4) the crosswind take-off;

(5) the optimum profile of winch launch and limitations;

(6) the procedure in case of cable break or aborted launch, launch failure procedures;

(7) how to teach the student pilot to perform safe winch launches;

(8) how to teach the student pilot to manage an aborted launch (different altitudes);

(9) how to analyse and correct errors as necessary.

Exercise 11b: Aero tow

(a) Objective:

To advise the student instructor on how to teach aero towing and on how to make sure that their student will manage an aborted launch. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the signals or communication before and during launch;

(2) the use of the launch equipment;

(3) the pre-take-off checks;

(4) the procedure for into wind take-off;

(5) the procedure for crosswind take-off;

(6) the procedure on tow: straight flight, turning and slip stream;

(7) the recovery from out-of-position on tow;

(8) the procedures in case of launch failure and abandonment;

(9) the descending procedure on tow (towing aircraft and sailplane);

(10) the reasons for launch failures and abandonment or procedures.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the signals before and during launch;

(2) the use of the launch equipment;

(3) the pre-take-off checks;

(4) the procedure for into wind take-off;

(5) the procedure for a crosswind take-off;

(6) the procedures on tow: straight flight, turning and slip stream;

(7) the recovery from out-of-position on tow;

(8) the procedure in case of launch failure and abandonment;

(9) the descending procedure on tow;

(10) how to teach the student pilot to perform safe aero tow launches;

(11) how to teach the student pilot to manage an aborted launch;

(12) how to analyse and correct errors as necessary.

Exercise 11c: Self launch

(a) Objective:

To advise the student instructor on how to teach launching with a self-launching sailplane and on how to make sure that his/her student will manage an aborted launch. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the engine extending and retraction procedures;

(2) the engine starting and safety precautions;

(3) the pre-take-off checks;

(4) the noise abatement procedures;

(5) the checks during and after take-off;

(6) the into wind take-off;

(7) the crosswind take-off;

(8) the procedure in case of power failure;

(9) the procedure in case of abandoned take-off;

(10) the maximum performance (short field and obstacle clearance) take-off;

(11) the short take-off and soft field procedure or techniques and performance calculations.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the engine extending and retraction procedures;

(2) the engine starting and safety precautions;

(3) the pre-take-off checks;

(4) the noise abatement procedures;

(5) the checks during and after take-off;

(6) the into wind take-off;

(7) the crosswind take-off;

(8) the power failures and procedures;

(9) the procedure in case of abandoned take-off;

(10) the maximum performance (short field and obstacle clearance) take-off;

(11) the short take-off and soft field procedure or techniques and performance calculations;

(12) how to teach the student pilot to perform safe self-launches;

(13) how to teach the student pilot to manage an aborted launch (different altitudes);

(14) how to analyse and correct errors as necessary.

Exercise 12: Circuit approach and landing

(a) Objective:

To advise the student instructor on how to teach their students to fly a safe circuit approach and to land the sailplane. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the procedures for rejoining the circuit;

(2) the procedures for collision avoidance and the lookout techniques;

(3) the pre-landing check;

(4) the normal circuit procedures, downwind, base leg;

(5) the effect of wind on approach and touchdown speeds ;

(6) the visualisation of a reference point;

(7) the approach control and use of airbrakes;

(8) the use of flaps (if applicable);

(9) the procedures for normal and crosswind approach and landing.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the procedures for rejoining the circuit;

(2) the procedures for collision avoidance and the look-out techniques;

(3) the pre-landing check;

(4) the standard circuit and contingency planning (for example running out of height);

(5) the effect of wind on approach and touchdown speeds;

(6) the visualisation of an aiming point;

(7) the approach control and use of airbrakes;

(8) the use of flaps (if applicable);

(9) the procedures for normal and crosswind approaches and landings;

(10) how to teach the student pilot to fly a safe circuit approach;

(11) how to improve the student pilot’s ability to perform a safe landing;

(12) how to analyse and correct errors as necessary.

Exercise 13: First solo

(a) Objective:

To advise the student instructor on how to prepare their students for the first solo flight.

(b) Briefing:

The student instructor has to explain:

(1) the limitations of the flight (awareness of local area and restrictions);

(2) the use of required equipment.

(c) Air exercise:

The student instructor has to;

(1) check with another or more senior instructor if the student can fly solo;

(2) monitor the flight;

(3) debrief the flight with the student.

Exercise 14 : Advanced turning

(a) Objective:

To advise the student instructor on how to fly steep turns or circles (45° banking) at constant attitude (speed) and with the yaw string centred. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain;

(1) the relationship between banking and speed;

(2) how to master steep turns or circles;

(3) the unusual attitudes which can occur (stalling or spinning and spiral dive);

(4) how to recover from these unusual attitudes.

(c) Air exercise:

The student has to demonstrate:

(1) steep turns (45°) at constant speed and with the yaw string centred;

(2) common errors (slipping and skidding);

(3) unusual attitudes and how to recover from them;

(4) how to teach the student pilot to fly steep turns or circles;

(5) how to analyse and correct errors as necessary.

Exercise 15: Soaring techniques

Note: if the weather conditions during the instructor training do not allow the practical training of soaring techniques, all items of the air exercises have to be discussed and explained during a long briefing exercise only.

Exercise 15a: Thermalling

(a) Objective:

To advise the student instructor on how to teach their students to recognise and detect thermals, on how to join a thermal and on how to look out, in order to avoid mid-air

collisions. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain;

(1) the look-out procedures;

(2) the detection and recognition of thermals;

(3) the use of audio soaring instruments;

(4) the procedure for joining a thermal and giving way;

(5) how to fly in close proximity to other sailplanes;

(6) how to centre in thermals;

(7) how to leave thermals.

(c) Air exercise:

The student instructor has to demonstrate;

(1) the look-out procedures;

(2) the detection and recognition of thermals;

(3) the use of audio soaring instruments;

(4) the procedure for joining a thermal and giving way;

(5) the procedure for flying in close proximity to other sailplanes;

(6) the centering in thermals;

(7) the procedure for leaving thermals;

(8) how to improve the student pilot's ability to recognise and detect thermals;

(9) how to improve the student pilot's ability to join a thermal and how to look out;

(10) how to analyse and correct errors as necessary.

Exercise 15b: Ridge flying

(a) Objective:

To advise the student instructor on how to teach his/her students to fly safely on ridges, to control their speed, and to apply the rules in order to avoid mid-air collisions. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the look-out procedures;

(2) the ridge flying rules;

(3) the recognition of optimum flight path;

(4) speed control.

(c) Air exercise: (if applicable during training and, if possible, at training site) The student instructor has to demonstrate:

(1) the look-out procedures;

(2) the practical application of ridge flying rules;

(3) the recognition of optimum flight path;

(4) speed control;

(5) how to teach the student pilot to fly safely on ridges;

(6) how to analyse and correct errors as necessary.

Exercise 15c: Wave flying

(a) Objective:

To advise the student instructor on how to introduce students to wave flying and to teach them to fly safely at high altitude. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the look-out procedures;

(2) the techniques to be used to accede to a wave;

(3) the speed limitations with increasing height;

(4) the risks of hypoxia and the use of oxygen.

(c) Air exercise: (if applicable during training and if possible at training site)

The student instructor has to demonstrate:

(1) the look-out procedures;

(2) the wave access techniques;

(3) the speed limitations with increasing height;

(4) the use of oxygen (if available);

(5) how to improve the student pilot's ability to recognise and detect waves;

(6) how to teach the student pilot to fly safely in a wave;

Exercise 16: Out-landings

Note: if the weather conditions during the instructor training do not allow the practical training of out-landing procedures (a touring motor glider may be used) all items of the air exercise have to be discussed and explained during a long briefing exercise only. Instructors may only teach the safe out-landing exercise after they have demonstrated the practical ability to do so.

(a) Objective:

To advise the student instructor on how to teach students to select an out-landing field, to fly the circuit and how to master the unusual landing situation. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the gliding range at max L/D;

(2) the engine re-start procedures (only for self-launching and self-sustaining sailplanes);

(3) the selection of a landing area;

(4) the circuit judgement and key positions;

(5) the circuit and approach procedures;

(6) the actions to be done after landing.

(c) Air exercise:

The student instructor has to demonstrate:

(1) precision landings on the airfield;

(2) the gliding range;

(3) the procedures for joining, arrival and circuit at a remote aerodrome;

(4) the selection of an out-landing area;

(5) the procedures for circuit and approach on an out-landing field;

(6) the actions to be done after landing;

The student instructor also has to be trained:

(7) how to advise the student pilot to do perform a safe out-landing;

(8) how to master an unusual landing situation;

(9) how to analyse and correct errors as necessary.

Exercise 17: Cross country flying

Note: if the weather conditions during the instructor training do not allow a cross country training flight the items of the air exercise have to be discussed and explained during a long briefing exercise only.

Exercise 17a: Flight planning

(a) Objective:

To advise the student instructor on how plan and prepare a cross-country flight.

(b) Briefing:

The student instructor has to explain:

(1) the weather forecast and current situation;

(2) the selection of the amount of water to be carried as a function of the weather forecast;

(3) the method for selecting a task, taking into account the average speed to be expected;

(4) the map selection and preparation;

(5) the NOTAMs and airspace considerations;

(6) the radio frequencies (if applicable);

(7) the pre-flight administrative procedures;

(8) the procedure for filing a flight plan where required;

(9) alternate aerodromes and landing areas.

Exercise 17b: In-flight navigation

(a) Objective:

To advise the student instructor on how to teach performing a cross-country flight.

(b) Briefing:

The student instructor has to explain:

(1) how to maintain track and re-route if necessary;

(2) the altimeter settings;

(3) the use of radio and phraseology;
(4) the in-flight planning;
(5) the procedures for transiting regulated airspace or ATC liaison where required;
(6) the procedure in case of uncertainty of position;
(7) the procedure in case of becoming lost;

(c) Air exercise:

The student instructor has to demonstrate:

(1) maintaining track and re-routing if necessary;
(2) altimeter settings;
(3) the use of radio and phraseology;
(4) in-flight planning;
(5) procedures for transiting regulated airspace or ATC liaison where required;
(6) uncertainty of position procedure;
(7) lost procedure;
(8) use of additional equipment where required;
(9) joining, arrival and circuit procedures at remote aerodrome;
(10) how to teach the student pilot to perform a cross-country flight;
(11) how to analyse and correct errors as necessary.

Exercise 17c: Cross-country soaring techniques

(a) Objective:

To advise the student instructor on the techniques for an efficient cross country flight.

(b) Briefing:

The student instructor has to explain:

(1) the speed to fly at maximal L/D ratio;
(2) the speed to fly to maximise the cruise speed (McCready theory);
(3) how to select the optimal track (efficient use of cloud streets etc.);
(4) how to calculate the final glide;
(5) how to perform a safe out-landing.

(c) Air exercise:

The student instructor has to demonstrate:

(1) a cross-country flight;
(2) the selection of the optimal track (efficient use of cloud streets, etc) ;
(3) the use of the McCready ring;
(4) use of final glide computers;
(5) how to reduce risk and to react to potential dangers;
(6) how to plan and perform an out-landing;
(7) how to teach the student pilot techniques for an efficient cross -country flight;
(8) how to analyse and correct errors as necessary.

B. Balloons

Long briefings and air exercises

Exercise 1: Familiarisation with the balloon

(a) Objective:

To advise the student Instructor on how to familiarise the student with the balloon which will be used for the training and to test his position in the basket for comfort, visibility, and ability to use all controls and equipment. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing and exercise:

The student instructor has to:

(1) present the type of balloon which will be used;

(2) explain the characteristics of the balloon;

(3) explain the components, instruments and equipment;

(4) explain the re-fuelling procedures (in the case of hot air balloons);

(5) to familiarise the student with the balloon controls;

(6) explain the differences when occupying the instructor's position;

(7) explain all checklists, drills and controls.

Exercise 2: Preparation for flight

(a) Objective:

To advise the student instructor on how to explain all the operations and necessary preparation to be completed before the flight. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing

The student instructor has to explain:

(1) the need for a pre-flight briefing;

(2) the structure and the content of this briefing;

(3) which documents are required on board;

(4) which equipment are required for a flight;

(5) the use of weather forecasts or actuals;

(6) the flight planning with particular regard to NOTAMs, airspace structure, sensitive areas, expected track and distance, pre-flight picture and possible landing fields;

(7) the use of load calculation chart;

(8) the selection of launch field with particular regard to permission, behaviour and adjacent fields.

(c) Air exercise:

The student instructor has to prepare and give a pre-flight briefing. The student instructor has to demonstrate:

(1) that the required documents are on board;

(2) that the equipment required for the intended flight is on board;

(3) how to advice the student to do the pre-planning procedures for each flight;

(4) how to perform a pre-launch check;

(5) how to select a launch field with particular regard to permission, behaviour and adjacent fields;

(6) how to teach the student pilot to perform the preparation to be completed prior to flight;

(7) how to analyse and correct errors of the student pilot as necessary.

Exercise 3: Crew and passenger briefing

(a) Objective:

To advise the student instructor on how to explain all the importance of correct clothing for pilot, passengers and crew and how to perform the briefing of ground- and retrieve crew and the briefing of passengers. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the correct clothing for passengers and crew;

(2) the briefings for ground- and retrieve crew and passengers.

(c) Air exercise:

The student instructor has to demonstrate:

(1) how to advise the passengers and crew about the correct clothing;

(2) the briefing of ground- and retrieve crew;

(3) the briefing of passengers;

(4) how to familiarise the student pilot with the different type of briefings;

(5) how to analyse and correct errors of the student pilot.

Exercise 4: Assembly and layout

(a) Objective:

To advise the student instructor on how to familiarise the student pilot with the control of the crowd and how to perform the securing of launch site. Furthermore the student instructor has to demonstrate how to familiarise the student pilot with the correct rigging of envelope and basket, the burner test procedure (hot air balloons) and the pre-inflation checks. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the control of the crowd;

(2) the securing of the launch site;

(3) the correct rigging procedure;

(4) the use of the restraint line;

(5) the pre-inflation checks.

(c) Air exercise:

The student instructor has to demonstrate:

(1) how to control the crowd and securing of launch site;

(2) the correct rigging of envelope and basket;

(3) the correct use of the restraint line;

(4) the burner test procedure (hot air balloons);

(5) the pre-inflation checks;

(6) how to teach the student pilot to perform the correct rigging;

(7) how to analyse and correct assembly errors of the student pilot as necessary.

Exercise 5: Inflation

(a) Objective:

To advise the student instructor on how to familiarise the student pilot with the different phases of the inflation procedure, the use of restraint line and inflation fan (hot air balloons) and the avoidance of electrostatic discharge (gas balloons). Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the different phases of the inflation procedure;

(2) the crowd control and securing procedures during inflation;

(3) the use of the inflation fan (hot air balloons);

(4) how to avoid electronic discharge (gas balloons).

(c) Air exercise:

The student instructor has to demonstrate:

(1) how to control of crowd and securing of launch site during inflation procedure;

(2) the cold inflation procedure and use of restraint line and inflation fan (hot air balloons);

(3) the hot inflation procedure (hot air balloons);

(4) the avoidance of electrostatic discharge (gas balloons);

(5) the inflation procedure (gas balloons);

(6) how to teach the student pilot to perform the inflation procedures;

(7) how to analyse and correct errors of the student pilot during the inflation procedure as necessary.

Exercise 6: Take off in different wind conditions

(a) Objective:

To advise the student instructor how to explain the pre take-off checks and briefings, the preparation for controlled climb and the use of restraint equipment. Furthermore the student instructor should be able to demonstrate the assessment of wind and obstacles, the preparation for false lift and the take-off techniques in different wind conditions. In

addition to this the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the pre take-off checks and briefings;

(2) the preparation for controlled climb;

(3) the 'hands off and hands on' procedure for ground crew;

(4) the assessment of lift;

(5) the use of the restraint equipment ;

(6) the assessment of wind and obstacles;

(7) the preparation for false lift;

(8) the take-off techniques from sheltered and non-sheltered launch fields.

(c) Air exercise:

The student instructor has to demonstrate:

(1) how to perform the pre take-off checks and briefings;

(2) how to prepare for controlled climb;

(3) how to perform the 'hands off and hands on' procedure for ground crew;

(4) how to perform the assessment of lift without endangering the ground crew;

(5) how to use the restraint equipment;

(6) how to perform the assessment of wind and obstacles;

(7) how to prepare for false lift;

(8) how to teach the student pilot the correct take off techniques from sheltered and non-sheltered launch fields;

(9) how to analyse and correct errors of the student pilot as necessary.

Exercise 7: Climb to level flight

(a) Objective:

To advise the student instructor on how to explain and demonstrate the climb to flight level. Furthermore the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the climbing with a predetermined rate of climb;

(2) the effect on envelope temperature (hot air balloons);

(3) the maximum rate of climb according to manufacturer's flight manual;

(4) how to level off at selected altitude.

(c) Air exercise:

The student instructor has to demonstrate:

(1) how to climb with a predetermined rate of climb;

(2) how to perform look out techniques;

(3) the effect on envelope temperature (hot air balloons);

(4) the maximum rate of climb according to manufacturer's flight manual;

(5) the levelling off techniques at selected altitude;

(6) how to advise the student pilot to perform the climb to level flight;

(7) how to analyse and correct faults or errors of the student pilot during the climb.

Exercise 8: Level flight

(a) Objective:

To advise the student instructor on how to explain and demonstrate level flight. Furthermore the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) how to maintain level flight by use of instruments;

(2) how to maintain level flight by use of visual references;

(3) how to maintain level flight by use of all available means;

(4) the use of parachute;

(5) the use of turning vents if installed (hot air balloons).

(c) Air exercise:

The student instructor has to demonstrate:

(1) how to maintain level flight by use of instruments;

(2) how to maintain level flight by use of visual references;

(3) how to maintain level flight by use of all available means;

(4) the use of parachute;

(5) the use of turning vents if installed (hot air balloons);

(6) how to advise the student pilot to perform the level flight;

(7) how to analyse and correct faults or errors of the student pilot during the level flight.

Exercise 9: Descent to level flight

(a) Objective:

To advise the student instructor on how to explain and demonstrate the descent to a certain flight level. Furthermore the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) how to descent with a predetermined rate of descent;

(2) a fast descent;

(3) the maximum rate of descent according to manufacturer's flight manual;

(4) the use of parachute;

(5) a parachute stall and cold descent (hot air balloons);

(6) the levelling off technique at selected altitude.

(c) Air exercise:

The student instructor has to demonstrate:

(1) a descent with a predetermined rate of descent;

(2) how to perform look out techniques;

(3) a fast descent;

(4) the maximum rate of descent according to manufacturer's flight manual;

(5) the use of parachute;

(6) how to level off at selected altitudes;

(7) how to advise the student pilot to perform a descent to a certain flight level;

(8) how to analyse and correct faults or errors of the student pilot during the descent.

Exercise 10: Emergencies

(a) Objective:

To advise the student instructor on how to explain and demonstrate the different emergency situations and how to react. Furthermore the student instructor should learn how to identify student errors during the simulated emergency exercises and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the pilot light failure (hot air balloons);

(2) burner failures, valve leaks, flame out and re-light (hot air balloons);

(3) gas leaks;

(4) closed appendix during take-off and climb (gas balloons);

(5) the envelope over temperature (hot air balloons);

(6) envelope damage in flight;

(7) the parachute or rapid deflation system failure;

(8) fire on ground and in the air;

(9) how to avoid an obstacle contact including contact with electrical power lines;

(10) escape drills, location and use of emergency equipment.

(c) Air exercise:

The student instructor has to demonstrate:

(1) a pilot light failure (hot air balloons);

(2) a burner failure, valve leaks, flame out and re-light (hot air balloons);

(3) gas leaks;

(4) a closed appendix during take-off and climb (gas balloons);

(5) envelope over temperature (hot air balloons);

(6) envelope damage in flight;

(7) parachute or rapid deflation system failure;

(8) a fire on ground and in the air;

(9) the escape drills, location and use of emergency equipment;

(10) how to advise the student pilot in performing the different emergency drills;

(11) how to analyse and correct faults or errors of the student pilot.

Exercise 11: Navigation

(a) Objective:

To advise the student instructor on how to explain and demonstrate the advanced navigational flight preparation. Furthermore the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the maps selection;

(2) the plotting of the expected track;

(3) the marking of positions and time;

(4) the calculation of distance and speed;

(5) the calculation of fuel consumption (hot air balloons);

(6) the calculation of ballast consumption (gas balloons);

(7) the ceiling limitations (ATC or weather);

(8) how to plan ahead;

(9) the monitoring of weather development;

(10) the monitoring of fuel or ballast consumption;

(11) ATC liaison (if applicable);

(12) the communication with retrieve crew;

(13) the use of GNSS.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the use of selected maps;

(2) the plotting of the expected track;

(3) the marking of positions and time;

(4) how to monitor of distance and speed;

(5) how to monitor the fuel or ballast consumption;

(6) the observance of ceiling limitations (ATC or weather);

(7) the planning ahead;

(8) the monitoring of weather development;

(9) the monitoring of envelope temperature (hot air balloons);

(10) ATC liaison (if applicable);

(11) communication with retrieve crew;

(12) use of GNSS;

(13) how to advise the student pilot in performing the navigational preparation;

(14) how to advise the student pilot in performing the different navigational in -flight tasks;

(15) how to analyse and correct faults or errors of the student pilot.

Exercise 12a: Fuel management hot air balloons

(a) Objective:

To advise the student instructor on how to explain and demonstrate the fuel management techniques. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the cylinder arrangement and the burner systems;

(2) the function of the pilot light supply (vapour or liquid);

(3) the use of master cylinders (if applicable);

(4) the fuel requirement and expected fuel consumption;

(5) the fuel state and pressure;

(6) the minimum fuel reserves;

(7) cylinder contents gauge and change procedure;

(8) the use of cylinder manifolds.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the cylinder arrangement and burner systems;

(2) the pilot light supply (vapour or liquid);

(3) the use of master cylinders (if applicable);

(4) how to monitor of fuel requirement and expected fuel consumption;

(5) the monitoring of fuel state and pressure;

(6) the monitoring of fuel reserves;

(7) the use of cylinder contents gauge and change procedure;

(8) the use of cylinder manifolds;

(9) how to advise the student pilot to perform the fuel management;

(10) how to analyse and correct faults or errors of the student pilot.

Exercise 12b: Ballast management gas balloons

(a) Objective:

To advise the student instructor on how to explain and demonstrate the ballast management. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the minimum ballast;

(2) the arrangement and securing of ballast;

(3) the ballast requirement and expected ballast consumption;

(4) the ballast reserves.

(c) Air exercise:

The student instructor also has to demonstrate:

(1) the arrangement of minimum ballast;

(2) the arrangement and securing of ballast;

(3) the ballast requirement calculation and expected ballast consumption;

(4) how to secure ballast reserves;

(5) how to advise the student pilot to perform the ballast management;

(6) how to analyse and correct faults or errors of the student pilot.

Exercise 13: Approach from low level

(a) Objective:

To advise the student instructor on how to explain and demonstrate the approach from level. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the pre landing checks;

(2) passenger pre-landing briefing;

(3) the selection of field;

(4) the use of burner and parachute (hot air balloons);

(5) the use of ballast or parachute and valve (gas balloons);

(6) the use of trail rope (if applicable) (gas balloons);

(7) the look-out;

(8) missed approach and fly on procedures.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the use of the pre landing checks;

(2) the selection of fields;

(3) the use of burner and parachute (hot air balloons);

(4) the use of ballast or parachute and valve (gas balloons);

(5) the use of trail rope (if applicable) (gas balloons);

(6) the lookout procedures and how to avoid possible distractions;

(7) the missed approach and fly on techniques;

(8) how to advise the student pilot to perform an approach from low level;

(9) how to analyse and correct faults or errors of the student pilot.

Exercise 14: Approach from high level

(a) Objective:

To advise the student instructor on how to explain and demonstrate the approach from high level. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the pre-landing checks;

(2) passenger pre-landing briefing;

(3) the selection of field;

(4) the rate of descent;

(5) the use of burner and parachute (hot air balloons);

(6) the use of ballast and parachute (gas balloons);

(7) the use of trail rope (if applicable) (gas balloons);

(8) the look-out;

(9) the missed approach and fly on procedures.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the pre-landing checks;

(2) the selection of field;

(3) the rate of descent;

(4) the use of burner and parachute (hot air balloons);

(5) the use of ballast and parachute (gas balloons);

(6) the use of trail rope (if applicable) (gas balloons);

(7) the lookout procedures and how to avoid potential distraction;

(8) the missed approach and fly on techniques;

(9) how to advise the student pilot to perform an approach from a hi gher level;

(10) how to analyse and correct faults or errors of the student pilot.

Exercise 15: Operating at low level

(a) Objective:

To advise the student instructor on how to explain and demonstrate the operation at a low height. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the use of burner and parachute (hot air balloons);

(2) the use of ballast and parachute (gas balloons);

(3) the look out;

(4) how to avoid a contact with low level obstacles;

(5) how to avoid sensitive areas (for example nature protection areas);

(6) land owner relations.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the use of burner and parachute (hot air balloons);

(2) the use of ballast and parachute (gas balloons);

(3) the lookout procedures and how to avoid potential distraction;

(4) how to avoid low level obstacles;

(5) good landowner relations;

(6) how to advise the student pilot to operate the balloon at a low level;

(7) how to analyse and correct faults or errors of the student pilot.

Exercise 16: Landing in different wind conditions

(a) Objective:

To advise the student instructor on how to explain and demonstrate landings in different wind conditions. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the correct actions for turbulences during the approach or landing;

(2) the passenger pre-landing briefing;

(3) the use of burner and pilot lights (hot air balloons);

(4) the use of ballast, parachute, valve and rip panel (gas balloons);

(5) the use of parachute and turning vents (if applicable);

(6) the look out;

(7) the landing, dragging and deflation;

(8) land owner relations.

(c) Air exercise:

The student instructor has to demonstrate:

(1) the pre-landing checks;

(2) the passenger briefing;

(3) the selection of field;

(4) the effect of turbulence;

(5) the use of burner and pilot lights (hot air balloons);

(6) the use of ballast, parachute, valve and rip panel (gas balloons);

(7) the use of parachute and turning vents (if applicable);

(8) the lookout procedures and how to avoid potential distraction;

(9) the landing, dragging and deflation procedures;

(10) how to advise the student pilot to perform a safe landing in different wind conditions;

(11) how to analyse and correct faults or errors of the student pilot.

Exercise 17: First solo

(a) Objective:

To advise the student instructor on how to prepare their students for the first solo flight.

(b) Briefing:

The student instructor has to explain:

(1) the limitations of the flight;

(2) the use of required equipment.

(c) Air exercise:

The student instructor has to:

(1) check with another or more senior instructor if the student can fly solo;

(2) monitor the pre-flight preparation;

(3) brief the student (expected flight time or emergency actions);

(4) monitor the flight as far as possible;

(5) debrief the flight with the student.

Exercise 18: Tethered flight hot air balloons (if tethered flight instructional qualification is required)

(a) Objective:

To advise the student instructor on how to explain and demonstrate the tethering techniques. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the ground preparations;

(2) the weather suitability;

(3) the tethering techniques and equipment;

(4) the maximum all-up-weight limitation;
(5) the crowd control;
(6) the pre take-off checks and briefings;
(7) the heating for controlled lift off;
(8) the 'hands off and hands on' procedure for ground crew;
(9) the assessment of wind and obstacles;
(10) the controlled climb to a pre-defined altitude (at least 60 ft).

(c) Air exercise:

The student instructor has to demonstrate:

(1) the ground preparations;
(2) the tethering techniques;
(3) the reason for maximum all-up-weight limitation;
(4) how to perform the crowd control;
(5) the pre take-off checks and briefings;
(6) the heating for controlled lift off;
(7) the 'hands off and hands on' procedure for ground crew;
(8) the assessment of wind and obstacles;
(9) the controlled climb;
(10) the landing techniques;
(11) how to advise the student pilot to perform a tethered flight;
(12) how to analyse and correct faults or errors of the student pilot.

Exercise 19: Night flying (if night instructional qualification required)

(a) Objective:

To advise the student instructor on how to explain and demonstrate the night flying techniques. Furthermore, the student instructor should learn how to identify student errors and how to correct them properly.

(b) Briefing:

The student instructor has to explain:

(1) the medical or physiological aspects of night vision;
(2) the use of lights for assembly, layout and inflation;
(3) the requirement for torch to be carried, (pre-flight inspection, etc.);
(4) the use of the external- and instrument lights;
(5) the night take-off procedure;
(6) the checklist procedures at night;
(7) the emergency procedures at night;
(8) the navigation principles at night;
(9) map marking for night use (highlighting built up or lit areas with thicker lines, etc.).
(10) Air exercise:

The student instructor has to demonstrate:

(11) the use of lights for assembly, layout and inflation;

(12) the use of torch for pre-flight inspection;

(13) the use of external- and instrument lights;

(14) the night take-off procedure;

(15) how to perform the checklist procedures at night;

(16) simulated night emergency procedures;

(17) night cross country techniques, as appropriate;

(18) how to advise the student pilot to perform a flight at night;

(19) how to analyse and correct faults or errors of the student pilot.

AMC1 FCL.940.FI(a)(2) FI Revalidation and renewal

FI or IRI refresher seminar

(a) FI or IRI refresher seminars made available in the State of Kuwait should have due regard to geographical location, numbers attending, and periodicity.

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

(c) Some experienced FIs or 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.

(d) The attendance form will be completed and signed by the organiser of the seminar as approved by the Kuwait DGCA, following attendance and satisfactory participation by the FI or IRI.

(e) The content of the FI or IRI refresher seminar should be selected from the following:

(1) new or current rules or regulations, with emphasis on knowledge of Part -FCL and operational requirements;

(2) teaching and learning;

(3) instructional techniques;

(4) the role of the instructor;

(5) national regulations (as applicable);

(6) human factors;

(7) flight safety, incident and accident prevention;

(8) airmanship;

(9) legal aspects and enforcement procedures;

(10) navigational skills including new or current radio navigation aids;

(11) teaching instrument flying;

(12) weather related topics including methods of distribution.

(13) any additional topic selected by the Kuwait DGCA.

(14) 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 and workshops.

GM1 FCL.940.FI(a)(2) FI Revalidation and renewal

FI certificate: revalidation and renewal form

A. Aeroplanes

INSTRUCTIONAL FLYING EXPERIENCE				
Instructors applying for revalidation of the FI certificate 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):				

FI REFRESHER SEMINAR		
1	This is to certify that the undersigned attended a n FI seminar	
2	Attendee's personal particulars:	
Name(s):		Address:
Licence number:		Expiration date of FI(A) certificate
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 FI seminar was carried out .		
Date of approval:		Name(s) of organiser (capital letters):
Date and place:		Signature:
5	Declaration by the attendee:	
I confirm the data under 1 through 3		
Attendee's signature:		

PROFICIENCY CHECK	
(Name(s) of applicant) has given proof of flying instructional ability during a proficiency check flight. This was done to the required standard.	
Flying time:	Aeroplane or FFS used:
Main exercise:	
Name(s) of FIE:	Licence number:
Date and place:	Signature:

B. HELICOPTERS

INSTRUCTIONAL FLYING EXPERIENCE			
Instructors applying for revalidation of the FI certificate should enter the instructional hours flown during the preceding 36 months.			
Instrument:			
Total instructional hours (preceding 36 months):			
Total instructional hours (preceding 12 months):			
FI REFRESHER SEMINAR			
1	This is to certify that the undersigned attended an FI seminar		
2	Attendees personal particulars:		
Name(s):		Address:	
Licence number:		Expiration date of FI(H) certificate:	
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 FI seminar was carried out.			
Date of approval:		Name(s) of organiser: (capital letters)	
Date and place:		Signature:	
5	Declaration by the attendee:		
I confirm the data under 1 through 3			
Attendee's signature:			
PROFICIENCY CHECK			
(Name(s) of applicant) has given proof of flying instructional ability during a proficiency check flight. This was done to the required standard.			
Flying time:		Helicopter or FFS used:	
Main exercise:			
Name(s) of FIE:		Licence number:	
Date and place:			
Signature:			

C. Airships

INSTRUCTIONAL FLYING EXPERIENCE				
Instructors applying for revalidation of the FI certificate 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		
1	This is to certify that the undersigned attended an FI seminar	
2	Attendee's personal particulars:	
Name(s):		Address:
Licence number:		Expiration date of FI(As) certificate:
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 FI seminar was carried out.		
Date of approval:		Name(s) of organiser: (capital letters)
Date and place:		Signature:
5	Declaration by the attendee:	
I confirm the data under 1 through 3		
Attendee's signature:		

PROFICIENCY CHECK	
(Name(s) of applicant) has given proof of flying instructional ability during a proficiency check flight. This was done to the required standard.	
Flying time:	Airship or FFS used:
Main exercise:	
Name(s) of FIE:	Licence number:
Date and place:	Signature:

D. Sailplanes instructional flying experience

INSTRUCTIONAL FLYING EXPERIENCE			
Instructors applying for revalidation of the FI certificate should enter the instructional hours and take-offs flown during the preceding 36 months.			
SAILPLANE (hours and take-offs)		TMG (hours and take-offs)	
DAY	NIGHT	DAY	NIGHT
Total instructional hours (preceding 36 months):			
Total instructional hours (preceding 12 months):			
Total amount of take-offs (preceding 36 months):			
Total amount of take-offs (preceding 12 months):			

FI REFRESHER SEMINAR			
1	This is to certify that the undersigned attended an FI seminar		
2	Attendee's personal particulars:		
Name(s):		Address:	
Licence number:		Expiration date of FI(S) certificate:	
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 FI seminar was carried out.			
Date of approval:		Name(s) of organiser (capital letters):	
Date and place:		Signature:	
5	Declaration by the attendee:		
I confirm the data under 1 through 3			
Attendee's signature:			

PROFICIENCY CHECK	
(Name(s) of applicant) has given proof of flying instructional ability during a proficiency check flight. This was done to the required standard.	
Flying time:	Sailplane or TMG used:
Main exercise:	
Name(s) of FIE:	Licence number:

Date and place:	Signature:

E. Balloons

INSTRUCTIONAL FLYING EXPERIENCE					
Instructors applying for revalidation of the FI certificate should enter the instructional hours flown during the preceding 36 months.					
Balloons (gas)		Balloons (hot-air)		Hot-air airships	
DAY	NIGHT	DAY	NIGHT	DAY	NIGHT
Total instructional hours (preceding 36 months):					
Total instructional hours (preceding 12 months):					

FI REFRESHER SEMINAR	
1	This is to certify that the undersigned attended a n FI seminar
2	Attendee's personal particulars:
Name(s):	Address:
Licence number:	Expiration date of FI(B) certificate:
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 FI seminar was carried out.	
Date of approval:	Name(s) of organiser (capital letters):
Date and place:	Signature:
5	Declaration by the attendee:
I confirm the data under 1 through 3	
Attendee's signature:	

PROFICIENCY CHECK	
(Name(s) of applicant) has given proof of flying instructional ability during a proficiency check flight. This was done to the required standard.	
Flying time:	Balloon or hot-air airship used:
Main exercise:	
Name(s) of FIE:	Licence number:
Date and place:	Signature:

GM1 FCL.905.TRI(b) Privileges and conditions

INSTRUCTORS INSTRUCTING FOR THE ISSUE OF A TRI OR SFI CERTIFICATE

Training in an aeroplane is not a requirement for the issue of an SFI or a TRI certificate. In order to deliver effective UPRT, it is beneficial for the instructor to have first-hand experience of the critical psychological and physiological human factors, which might be present during recoveries from developed upsets. These human factors (effects of unusual acceleration, such as variations from normal 1G flight, the difficulty to perform counter-intuitive actions, and the management of the associated stress response) can only be experienced during training in an aeroplane because FFSs are not capable of reproducing sustained accelerations. Completion of the advanced UPRT course in accordance with FCL.745.A would provide such experience and is therefore useful for instructors providing instruction for the issue of a TRI or an SFI certificate.

GM1 FCL.910.TRI(b)(2) TRI training for type extension

'Relevant parts of the technical training and the flight instruction parts of the applicable TRI training course' means that the training should be relevant to its purpose, taking into consideration the experience of the individual TRI on other aircraft types that are similar to the one for which the extension of TRI privileges is applied for.

AMC1 FCL.930.TRI TRI — Training course

TRI Training Course: Aeroplanes

General

The aim of the TRI(A) training course set out in FCL.930 is to train aeroplane licence holders to the level of competence defined in FCL.920 and adequate for a TRI(A) and SFI(A) as applicable. The restricted privileges outlined in FCL.910.TRI(a) allow a TRI(A) to instruct in a simulator only (FSTD). This qualification is endorsed in the licence as 'FFS'. Additional training is required before instruction in an aircraft can be undertaken.

The additional training required for a TRI(A) to conduct training in an aircraft will depend on the purpose of that aircraft training. Either:

(1) To conduct line flying under supervision when a TRI(A) is required for ZFTT or Recency (licence endorsed 'And LIFUS instructor); or

(2) To conduct take-offs and landings in the aircraft to complete the training requirement at the end of a Type Rating Course in a simulator as per AMC2 ORA.ATO.125(k)(1) (licence endorsed 'T/os & ldgs only'); or

(3) To conduct full type rating training in an aircraft when a simulator is not available, including abnormal and emergency procedures (i.e. an unrestricted qualification; licence endorsed 'A/c').

For a TRI(A) qualified solely as 'A/c', additional training is required before giving flight instruction in a simulator (FSTD). An unrestricted aircraft qualification when combined with the simulator qualification is endorsed 'A/c & FFS'.

The content of the TRI(A) training programme should cover training exercises applicable to the aeroplane type as set out in the applicable type rating course. The

training programme should take into account the training as determined in the operational suitability data established in accordance with Part-21.

For a TRI(A) the amount of practical training will vary depending on the complexity of the aeroplane type. For flight instruction in an aircraft the candidate instructor should be able to teach the air exercises safely and effectively from a pilot seat. Some training should be carried out in an appropriately qualified simulator for this purpose prior to any actual aircraft training.

Course documentation should include a manual for candidate instructor use, giving a full description of the course, with supplementary notes; and a separate Tutor manual explaining the course delivery concepts, the course progression and changing emphasis.

Candidate instructors should be taught the teaching methods used in flying training and regarded as ‘best practice’. These methods require the instructor to work to a syllabus with clearly defined objectives; provide a positive instructional input, which includes demonstration and/or verbal instruction as appropriate prior to student practice; be able to identify errors, and explain how to correct them, in order to teach to proficiency.

The TRI(A) training course should develop safety awareness throughout by teaching the knowledge, skills and attitudes relevant to giving instruction for a type rating, whether the certificate is restricted or not. There should be particular emphasis on the importance of the non-technical skills and the role of CRM, TEM or MCC as appropriate.

A TRI(A) may 'tutor' a TRI(A) course and an SFI(A) may 'tutor' a SFI(A) course when they have completed:

(1) 3 years as a TRI or SFI

(2) at least 50 hours of flight instruction as a TRI or SFI in the applicable type or a FSTD representing that type;

(3) a two day tutor course;

(4) a Tutor Assessment of Competence with an examiner approved for the purpose.

Approved training organisations (ATOs) should provide sufficient mentoring to develop the skills required of a TRI or SFI Tutor to deliver the TRI course syllabus, before the Assessment of Competence takes place.

Content

The TRI training course consists of three parts:

(1) Part 1: teaching and learning instruction that should comply with AMC1 FCL.920;

(2) Part 2: technical theoretical knowledge instruction (technical training);

(3) Part 3: flight instruction.

The minimum training required for Parts 1, 2 & 3 specified in Part FCL is deemed sufficient to qualify an Instructor for a 'FFS' qualification or, if the training has been wholly orientated towards aircraft instruction, an 'A/c' qualification. Therefore, the endorsements 'And LIFUS instructor', 'T/o's & ldgs only', or 'A/c' when added to 'FFS' all require upgrade courses of appropriate duration.

Training for 'And LIFUS instructor' requires a minimum of half a day classroom, 1 x 2hr simulator session per Instructor, plus line flights with a TRI as specified in Part 3 (j) and (k).

Training for 'T/os & ldgs' requires a minimum of half a day classroom, 2 x 2hr simulator sessions, plus training and an AoC in the aircraft.

When full 'A/c' privileges are added to FFS, in addition to classroom topics, the whole aircraft syllabus has to be covered although some exercises may be in abbreviated form. Preferably this training is accomplished in both simulator and aircraft.

Part 1 – Teaching and Learning Instruction Syllabus

The content of the teaching and learning part of the FI training course, as established in AMC1 FCL.930.FI, should be used as guidance to develop the TRI course syllabus. The course is a minimum of 25 hours. A dedicated CRM/TEM module should be included to teach the practical assessment of CRM/TEM using a recognised 'NOTECH' framework.

Part 2 - Technical Theoretical Knowledge Instruction Syllabus

The technical theoretical knowledge instruction should comprise not less than 10 hours training to refresh Part 1 theoretical topics as necessary, and aeroplane technical knowledge. It should include the preparation of lesson plans and the development of briefing room instructional skills. A proportion of the allotted 10 hours should be integrated with the practical flight instruction lessons in Part 3, using expanded pre-

flight and post flight briefing sessions. Consequently, for practical purposes Part 2 and Part 3 should be considered complimentary to each other.

Note: When a TRI(A) is additionally required to teach the ground technical theoretical syllabus on a type rating course, the candidate instructor should understudy a qualified course ground instructor delivering lectures from the ground school syllabus. Sufficient exposure by observation and mentoring should continue until the new instructor is competent to deliver the whole syllabus in the classroom environment. This training is separate to the Part 2 training described here.

FSTD and AIRCRAFT (Common Components)

Each topic should be tailored to the privileges sought by the candidate instructor

(1) Planning/weather considerations

(2) Airfield selection including alternates

(3) Legal constitution of a crew (MPA and SP HPC(A) operated single-pilot or multi-pilot)

(4) Fuel Planning

(5) Loading

(6) Lesson Plans

(7) Pre- Flight Briefing content

(8) Teaching points specific to each exercise

(9) Methods of handing over and taking control

(10) Use of automatics

(11) Correct Seat position

(12) Fatigue/overload of inexperienced students

(13) Typical student errors

(14) Intervention strategies

(15) Note taking/Tech log times

Additional for FSTD Privileges

The Common Components plus:

(1) Simulator Safety features

(2) Simulator briefing

(3) Simulator Capabilities

(4) Simulator Limitations

(5) Instructor Station

(6) Emergency Evacuation

Additional for AIRCRAFT Privileges for ZFTT or Recency (‘And LIFUS instructor’)

The Common Components plus:

(1) Use of a Safety Pilot

(2) The duties of the Safety Pilot

(3) Covering the controls at critical times

(4) Handling real emergencies at critical times

(5) Dealing with student errors/omissions during Normal and Actual Abnormal or Emergency operations

(6) Weather, Cloud, Visibility and Surface Wind considerations

Additional for AIRCRAFT Privileges for Take-Off and Landing training ('T/os & ldgs only')

The Common Components, plus the ZFTT/Recency components plus:

(1) Use of a training checklist

(2) Training SOP's, including FMS programming

(3) MEL use on training flights

(4) Ballast requirements

(5) Touch and Go's: Advantages/disadvantages; prescribed method; minimum runway length and how it is derived; V speed consideration

(6) Use of 'Follow Through' technique (if relevant to aircraft type)

(7) ATC liaison

(8) Brake cooling

(9) Crew changes

(10) Fatigue/overload of instructor and students

Additional for AIRCRAFT unrestricted Privileges ('A/c')

The Common Components, plus the ZFTT/Recency components, plus the Take-Off and Landing components, plus:

(1) Appropriate methods and minimum altitudes for simulating failures

(2) Zero Thrust settings

(3) Minimum altitudes for stalling exercises

(4) Airspace utilisation

(5) Additional weather constraints – maximum crosswind for simulated engine out landings

Part 3 – Flight Instruction Syllabus (For FSTD and/or AIRCRAFT privileges)

The course should consist of at least 5 hours of flight instruction for single-pilot aircraft operated in single-pilot operations, and 10 hours for multi-pilot aircraft or single-pilot certified aircraft operated in multi-pilot operations per candidate instructor.

The candidate instructor should gain experience in teaching a variety of exercises, covering both normal and abnormal operations, including engine-out handling. Those exercises considered more demanding for converting student pilots should be included.

The course should comprehensively cover the whole range of instructor skills enabling the applicant to plan, brief, train and debrief sessions using all relevant training techniques appropriate to pilot training.

CRM, TEM or MCC, and the appropriate use of behavioural markers should be integrated throughout.

FSTD and AIRCRAFT (Common Components)

The candidate instructor should receive instruction in an appropriately qualified FSTD representing the type of aeroplane to a satisfactory level as follows:

(1) Left and right hand seat familiarisation;

(2) Pre-flight preparation and use of checklists;

(3) Taxing;

(4) Take-off;

(5) Rejected take-off;

(6) Engine failure during take-off, after V1;

(7) Engine inoperative approach and go-around;

(8) One engine (critical) simulated inoperative landing;

(9) Other abnormal and emergency procedures as necessary;

(10) Methods for giving appropriate commentary;

(11) Intervention strategies

Additional for FSTD Privileges (for ‘FFS’ only)

The Common Components plus:

The candidate instructor should receive instruction in an appropriately qualified FSTD representing the type of aeroplane to a satisfactory level as follows:

(1) The candidate instructor should be made familiar with the device, limitations and capabilities, and the safety features, including emergency evacuation.

(2) The candidate instructor should be taught how to use the instructor station, and give instruction from that position. The candidate instructor should also be taught how to conduct a flying demonstration from a pilot seat giving appropriate commentary.

Additional for AIRCRAFT Privileges ZFTT or Recency (‘And LIFUS instructor’);

The Common Components plus:

The candidate instructor should receive instruction in an appropriately qualified FSTD representing the type of aeroplane to a satisfactory level as follows:

(1) Strategies developed from situations role-played by a TRI course instructor, taken from but not limited to:

(i) Taxiing and turning circles;

(ii) Take-off configuration warning;

(iii) Over controlling;

(iv) High flare: long float;

(v) Long flare;

(vi) Baulked landing;

(vii) Immediate go-around from touchdown;

(viii) Too high on approach: no flare;

(ix) Incorrect configuration;

(x) TAWS Warning;

(xi) Misuse/incorrect use of rudder;

(xii) Over controlling in roll or pitch during flare;

(xiii) Incapacitation;

(xiv) Actual abnormal or emergencies.

Additional for AIRCRAFT Privileges Take-off and Landing training ('T/os & ldgs only'):

The Common Components, plus the ZFTT/Recency components, plus:

The candidate instructor should receive instruction in an appropriately qualified FSTD representing the type of aeroplane to a satisfactory level as follows:

(1) Strategies developed from situations role-played by a TRI course instructor, taken from but not limited to:

(i) Particularities of handling the aeroplane in touch and go manoeuvres;

(ii) Dealing with incorrect actions by student during touch and go (e.g. selection of reverse thrust);

(iii) Circuit management and in-flight de-briefing techniques.

Additional for AIRCRAFT Unrestricted privileges including abnormal and emergency procedures ('A/c'):

The Common Components, plus the ZFTT/Recency components, plus the Take-off and Landing Components, plus

The candidate instructor should receive instruction in an appropriately qualified FSTD representing the type of aeroplane to a satisfactory level as follows:

(1) Strategies developed from situations role-played by a TRI course instructor, taken from but not limited to:

(i) Simulating failures;

(ii) Mishandled stalling exercises;

(iii) Failure of a critical engine;

(iv) Approach and full-stop landing with simulated engine-out;

(v) Abnormal and emergencies applicable to the aeroplane type.

Upon successful completion of the training above and where aircraft privileges are sought, the applicant should receive training in an aircraft in-flight under the supervision of a TRI(A) complimentary to the training provided in the simulator.

At the completion of training the applicant instructor should be required to provide flight instruction appropriate to the privilege sought under the supervision and to the satisfaction of a TRI(A) nominated for this purpose by the training organisation.

Line Flying Under Supervision (ZFTT/Recency - 'And LIFUS Instructor')

(1) The aircraft training at Part 3 (j) and the assessment by a TRI at Part 3 (k) may be conducted on a commercial air transport flight.

Training were no FSTD Exists (Unrestricted Aircraft Privileges – 'A/c' only)

(1) Where no FSTD exists for the type for which the certificate is sought, a course of training should be conducted on the applicable aeroplane type. This includes all elements listed above, the synthetic device elements being replaced with appropriate exercises in the aircraft.

Training for Asymmetric Power Flight on SP MET Aeroplanes

During this part of the training, special emphasis is to be placed on the:

(1) circumstances in which actual feathering and un-feathering practice will be done, for example safe altitude; compliance with regulations about minimum altitude or height for feathering practice, weather conditions, distance from nearest available aerodrome.

(2) procedure to use for instructor and student co-operation, for example 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 or re-started or set at zero thrust and identifying each control and naming the engine it is going to affect.

(3) consideration to be given to avoid over-working the operating engine, and the degraded performance when operating the aeroplane during asymmetric flight.

(4) need to use the specific checklist for the aeroplane type.

Long Briefings:

(1) Flight on asymmetric power

(i) introduction to asymmetric flight;

(ii) feathering the propeller: method of operation;

(iii) effects on aeroplane handling at cruising speed;

(iv) introduction to effects upon aeroplane performance;

(v) note foot load to maintain a constant heading (no rudder trim);

(vi) un-feathering the propeller: regain normal flight;

(vii) finding the zero thrust setting: comparison of foot load when feathered and with zero thrust set.

(viii) effects and recognition of engine failure in level flight;

(ix) the forces and the effects of yaw;

(x) types of failure:

(A) sudden or gradual;

(B) complete or partial.

(xi) yaw, direction and further effects of yaw;

(xii) flight instrument indications;

(xiii) identification of failed engine;

(xiv) the couples and residual out of balance forces: resultant flight attitude;

(xv) use of rudder to counteract yaw;

(xvi) use of aileron: dangers of misuse;

(xvii) use of elevator to maintain level flight;

(xviii) use of power to maintain a safe air speed and altitude;

(xix) supplementary recovery to straight and level flight: simultaneous increase of speed and reduction in power;

(xx) identification of failed engine: = idle engine;

(xxi) use of engine instruments for identification:

(A) fuel pressure or flow;

(B) RPM gauge response effect of CSU action at lower and higher air speed;

(C) engine temperature gauges.

(xxii) confirmation of identification: close the throttle of identified failed engine;

(xxiii) effects and recognition of engine failure in turns;

(xxiv) identification and control;

(xxv) side forces and effects of yaw.

(2) During turning flight:

(i) effect of 'inside' engine failure: effect sudden and pronounced;

(ii) effect of 'outside' engine failure: effect less sudden and pronounced;

(iii) the possibility of confusion in identification (particularly at low power):

(A) correct use of rudder;

(B) possible need to return to lateral level flight to confirm correct identification;

(iv) visual and flight instrument indications;

(v) effect of varying speed and power;

(vi) speed and thrust relationship;

(vii) at normal cruising speed and cruising power: engine failure clearly recognised;

(viii) at low safe speed and climb power: engine failure most positively recognised;

(ix) high speed descent and low power: possible failure to notice asymmetry (engine failure);

(3) Minimum control speeds:

(i) 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 aeroplane in asymmetric power flight during extreme or critical situations. It is not a demonstration of Vmca.

(ii) 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 Vsse;

(iii) establish a minimum control speed for each asymmetrically disposed engine: to establish critical engine (if applicable);

(iv) effects on minimum control speeds of:

(A) bank;

(B) zero thrust setting;

(C) take-off configuration:

- landing gear down and take-off flap set;
- landing gear up and take-off flap set.

Note: it is important to appreciate that the use of 5° 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° of bank in this manner when determining the Vmca for the specific type. Thus the Vmca quoted in the aeroplane manual will have been obtained using the technique.

(4) Feathering and un-feathering:

(i) minimum heights for practising feathering or un-feathering drills;

(ii) engine handling: precautions (overheating, icing conditions, priming, warm up and method of simulating engine failure: reference to aircraft engine manual and service instructions and bulletins).

(5) Engine failure procedure:

(i) 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;

(ii) flight phase:

(A) in cruising flight;

(B) critical phase such as immediately after take-off or during the approach to landing or during a go-around.

(6) Aircraft type

(i) Variations will inevitably occur in the order of certain drills and checks due to differences between aeroplane types and perhaps between models of the same type. The flight manual or equivalent document (for example owner's manual or pilot's operating handbook) is to be consulted to establish the exact order of these procedures.

(ii) For example, one flight manual or equivalent document (for example owner's manual or pilot's operating handbook) may call for the raising of flaps and landing gear

before 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.

(iii) Again, in some aeroplanes, 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.

(iv) 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 manual or equivalent document (for example owner's manual or pilot's operating handbook) for the specific aeroplane type being used on the course.

(7) In-flight engine failure in cruise or other flight phase not including take-off or landing:

(i) immediate actions:

(A) recognition of asymmetric condition;

(B) identification and confirmation of failed engine:

- idle leg = idle engine;
- closing of throttle for confirmation.

(C) cause and fire check:

- typical reasons for failure;
- methods of rectification.

(D) feathering decision and procedure:

- reduction of other drag;
- need for speed but not haste;
- use of rudder trim.

(ii) subsequent actions:

(A) 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.

(B) re-plan flight:

- ATC and weather;
- terrain clearance, SE cruise speed;
- decision to divert or continue.

(C) fuel management: best use of remaining fuel;

(D) dangers of re-starting damaged engine;

(E) action if unable to maintain altitude: effect of altitude on power available;

(F) effects on performance;

(G) effects on power available and power required;

(H) effects on various airframe configuration and propeller settings;

(I) use of flight or owner's manual:

- cruising;
- climbing: ASI colour coding (blue line);
- descending;
- turning.

(J) 'live' engine limitations and handling;

(K) take-off and approach: control and performance;

(8) Significant factors:

(i) significance of take-off safety speed:

(A) effect of landing gear, flap, feathering, take-off, trim setting and systems for operating landing gear and flaps;

(B) effect on mass, altitude and temperature (performance).

(ii) significance of best SE climb speed (Vyse):

(A) acceleration to best engine climb speed and establishing a positive climb;

(B) relationship of SE climb speed to normal climb speed;

(C) action if unable to climb.

(iii) significance of asymmetric committal height and speed: action if baulked below asymmetric committal height;

(9) Engine failure during take-off:

(i) below Vmca or unstick speed:

(A) accelerate or stop distance considerations;

(B) prior use of flight manual data if available.

(ii) above Vmca or unstick speed and below safety speed;

(iii) immediate re-landing or use of remaining power to achieve forced landing;

(iv) considerations:

(A) degree of engine failure;

(B) speed at the time;

(C) mass, altitude, temperature (performance);

(D) configuration;

(E) length of runway remaining;

(F) position of any obstacles ahead;

(10) Engine failure after take-off:

(i) simulated at a safe height and at or above take-off safety speed;

(ii) considerations:

(A) need to maintain control;

(B) use of bank towards operating engine;

(C) use of available power achieving best SE climb speed;

(D) mass, altitude, temperature (performance);

(E) effect of prevailing conditions and circumstances.

(iii) Immediate actions:

(A) maintenance of control, including air speed and use of power;

(B) recognition of asymmetric condition;

(C) identification and confirmation of failed engine;

(D) feathering and removal of drag (procedure for type);

(E) establishing best SE climb speed.

(iv) Subsequent actions: whilst carrying out an asymmetric power climb to the downwind position at SE best rate of climb speed:

(A) cause and fire check;

(B) live engine, handling considerations;

(C) remaining services;

(D) ATC liaison;

(E) fuel management.

Note: these procedures are applicable to aeroplane type and flight situation.

(11) Asymmetric committal height:

(i) 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 CS-23 aeroplanes 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 aeroplane 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 aeroplane 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 aeroplane round again for another circuit. This height will be compatible with the aeroplane 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.

(ii) Circuit approach and landing on asymmetric power:

(A) definition and use of asymmetric committal height;

(B) use of standard pattern and normal procedures;

(C) action if unable to maintain circuit height;

(D) speed and power settings required;

(E) decision to land or go-around at asymmetric committal height: factors to be considered;

(iii) Undershooting: importance of maintaining correct air speed, (not below Vyse).

(12) Speed and heading control:

(i) height, speed and power relationship: need for minimum possible drag;

(ii) establishing positive climb at best SE rate of climb speed:

(A) effect of availability of systems, power for flap and landing gear;

(B) operation and rapid clean up.

Note 1: The air speed at which the decision is made to commit the aeroplane to a landing or to go-around should normally be the best SE 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.

(13) Engine failure during an all engines approach or missed approach:

(i) use of asymmetric committal height and speed considerations;

(ii) 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.

(14) Instrument flying on asymmetric power:

(i) considerations relating to aircraft performance during:

(A) straight and level flight;

(B) climbing and descending;

(C) standard rate turns;

(D) level, climbing and descending turns including turns onto pre-selected headings.

(ii) vacuum operated instruments: availability;

(iii) electrical power source.

Specific trainings: LIFUS training and landing training

The applicant for a TRI(A) certificate should receive instruction in an FSTD in accordance with FCL.930.TRI(a)(4).

(1) LIFUS training: content

(a) Training in an FSTD:

(1) familiarisation as PF on both seats, as applicable, which should include at least the following:
(i) pre-flight preparation and use of checklists;
(ii) taxiing;
(iii) take-off;
(iv) rejected take-off;
(v) engine failure during take-off, after take-off decision speed (V1);
(vi) one-engine-inoperative approach and go-around;
(vii) one-engine-inoperative (critical, simulated) landing;
(viii) other emergency and abnormal operating procedures (as necessary);
(ix) emergency evacuations; and

(x) task sharing and decision-making; and

(2) aeroplane training techniques:
(i) methods of providing appropriate commentary; and
(ii) intervention strategies developed from situations that are role-played by a TRI training course instructor, taken from but not limited to:
(A) take-off:
— tail strike awareness and avoidance,
— rejected take-off,
— actual engine failure,
— take-off configuration warning, and
— overcontrolling;
(B) approach and landing:
— normal approach,
— high flare, long float, no flare,
— immediate go-around after touchdown,
— baulked landing,
— rejected landing,
— crosswind, and
— overcontrolling; and
(C) flight management:
— task sharing and handover of controls,
— effect of ATC-delaying actions on endurance,
— alternate management and diversion, and

— traffic awareness when flying in pattern

(b) Training in aeroplane (in flight)
This training should consist of at least one route sector where the candidate instructor:
(1) either observes a TRI(A) who conducts line flying under supervision, or
(2) conducts role play line flying under supervision for a TRI(A) who is qualified for line flying under supervision.

Upon completion of the above-mentioned training, the candidate instructor should complete a route sector under the supervision and to the satisfaction of a TRI(A) who is nominated for that purpose by the ATO.

(2) Landing training: content
(a) Training in an FSTD
The training in an FSTD should be tailored and appropriate to the aeroplane type, and the exercises should be more demanding for each candidate instructor. In addition to the LIFUS training items in the FSTD (listed under (a)(1) and (a)(2) above), the landing training should comprise a variety of exercises that cover both normal and abnormal operations including the following:

(1) consideration of threats during touch-and-go:
(i) operating at low altitude;
(ii) General Aviation (GA) traffic;
(iii) increased fuel consumption;
(iv) bird strikes;
(v) decision to continue touch-and-go or make a full-stop landing; and
(vi) aspects of performance and associated risks;
(2) incorrect rudder inputs;
(3) failure of a critical engine;
(4) approach and full-stop landing in simulated engine-out flight; and
(5) go-around in simulated engine-out flight. The applicant needs to be additionally trained in other abnormal items during the training course, if required.

(c) Training in an aeroplane

(1) Upon completion of the FSTD training, the applicant should perform role-play flying for landing training under the supervision and to the satisfaction of a TRI(A) who is nominated for that purpose by the ATO.
The training should cover at least the following elements:
(i) take-off,
(ii) traffic pattern,
(iii) touch-and-go,
(iv) go-around, and
(v) full-stop landing with different flap settings.

(2) In exceptional circumstances, it may be necessary to perform simulated engine-out handling and engine-out operations in an aeroplane in addition to representative exercises from the type rating course.

UPRT

Instructors should have the specific competence to provide UPRT during the type rating training course, including the ability to demonstrate knowledge and understanding of the type-specific upset recovery procedures and of the recommendations that are developed by the original equipment manufacturers (OEMs). Therefore, during the TRI training course, the student instructor should:
(A) be able to apply the correct upset recovery techniques for the specific aeroplane type;
(B) understand the importance of applying type-specific OEM procedures for recovery manoeuvres;
(C) be able to distinguish between the applicable SOPs and OEM recommendations (if available);
(D) understand the capabilities and limitations of the FSTDs that are used for UPRT;
(E) ensure that the training remains within the FSTD training envelope to avoid the risk of negative transfer of training;
(F) understand and be able to use the IOS of the FSTD in the context of providing effective UPRT;
(G) understand and be able to use the available FSTD instructor tools to provide accurate feedback on pilot performance;
(H) understand the importance of adhering to the FSTD UPRT scenarios that are validated by the training programme developer; and
(I) understand the missing critical human factor aspects due to the limitations of the FSTD, and convey this to the student pilot(s) receiving the training.

AMC2 FCL.930.TRI TRI training course

Helicopters general

(a) The aim of the TRI(H) course is to train helicopter licence holders to the level of competence defined in FCL.920 and adequate for a TRI.

(b) The training course should develop safety awareness throughout by teaching the knowledge, skills and attitudes relevant to the TRI(H) task, and should be designed to give adequate training to the applicant in theoretical knowledge instruction, flight instruction and FSTD instruction to instruct for a helicopter type rating for which the applicant is qualified.

(c) The TRI(H) training course should give particular emphasis to the role of the individual in relation to the importance of human factors in the man-machine environment and the role of CRM.

(d) Special attention should be given to the applicant's maturity and judgment including an understanding of adults, their behavioural attitudes and variable levels of learning ability. During the training course the applicants should be made aware of their own attitudes to the importance of flight safety. It will be important during the course of training to aim at giving the applicant the knowledge, skills and attitudes relevant to the role of the TRI.

(e) For a TRI(H) certificate the amount of flight training will vary depending on the complexity of the helicopter type.

(f) A similar number of hours should be used for the instruction and practice of pre-flight and post flight briefing for each exercise. The flight instruction should aim to ensure that the applicant is able to teach the air exercises safely and efficiently and should be related to the type of helicopter on which the applicant wishes to instruct. The content of the training program should cover training exercises applicable to the helicopter type as set out in the applicable type rating course syllabus.

(g) A TRI(H) may instruct in a TRI(H) course once he or she has conducted a minimum of four type rating instruction courses.

Content

(h) The training course consists of three parts:

(1) Part 1: teaching and learning, that should comply with AMC1 FCL.920;

(2) Part 2: technical theoretical knowledge instruction (technical training);

(3) Part 3: flight instruction.

Part 1

The content of the teaching and learning part of the FI training course, as established in AMC1 FCL.930.FI, should be used as guidance to develop the course syllabus.

Part 2

Technical theoretical knowledge instruction syllabus

(a) The technical theoretical knowledge instruction should comprise of not less than 10 hours training to include the revision of technical knowledge, the preparation of lesson plans and the development of classroom instructional skills to enable the TRI(H) to instruct the technical theoretical knowledge syllabus.

(b) If a TRI(H) certificate for MP helicopters is sought, particular attention should be given to multi-crew cooperation.

(c) The type rating theoretical syllabus should be used to develop the TRI(H)'s teaching skills in relation to the type technical course syllabus. The course instructor should deliver example lectures from the applicable type technical syllabus and the

candidate instructor should prepare and deliver lectures on topics selected by the course instructor from the subject list below:

(1) helicopter structure, transmissions, rotor and equipment, normal and abnormal operation of systems:

(i) dimensions;

(ii) engine including aux. power unit, rotors and transmissions;

(iii) fuel system;

(iv) air-conditioning;

(v) ice protection, windshield wipers and rain repellent;

(vi) hydraulic system;

(vii) landing gear;

(viii) flight controls, stability augmentation and autopilot systems;

(ix) electrical power supply;

(x) flight instruments, communication, radar and navigation equipment;

(xi) cockpit, cabin and cargo compartment;

(xii) emergency equipment.

(2) limitations:

(i) general limitations, according to the helicopter flight manual;

(ii) minimum equipment list.

(3) performance, flight planning and monitoring:

(i) performance;

(ii) light planning.

(4) load and balance and servicing:

(i) load and balance;

(ii) servicing on ground;

(5) emergency procedures;

(6) special requirements for helicopters with EFIS;

(7) optional equipment.

Part 3

Flight instruction syllabus

(a) The amount of flight training will vary depending on the complexity of the helicopter type. At least 5 hours flight instruction for a SP helicopter and at least 10 hours for a MP ME helicopter should be counted. A similar number of hours should be used for the instruction and practice of pre-flight and post flight briefing for each exercise. The flight instruction should aim to ensure that the applicant is able to teach the air exercises safely and efficiently and related to the type of helicopter on which the applicant wishes to instruct. The content of the training programme should only

cover training exercises applicable to the helicopter type as set out in Appendix 9 to Part-FCL.

(b) If a TRI(H) certificate for MP helicopters is sought, particular attention should be given to MCC.

(c) If a TRI(H) certificate for revalidation of instrument ratings is sought, then the applicant should hold a valid instrument rating.

Flight or FSTD training

(d) The training course should be related to the type of helicopter on which the applicant wishes to instruct.

(e) For MP helicopter type ratings MCC, CRM and the appropriate use of behavioural markers should be integrated throughout.

(f) The content of the training programme should cover identified and significant exercises applicable to the helicopter type.

FSTD training

(g) The applicant for a TRI(H) certificate should be taught and made familiar with the device, its limitations, capabilities and safety features, and the instructor station.

(h) The applicant for a TRI(H) certificate should be taught and made familiar with giving instruction from the instructor station seat as well as the pilot's seats, including demonstrations of appropriate handling exercises.

(i) Training courses should be developed to give the applicant experience in training a variety of exercises, covering both normal and abnormal operations. The syllabus should be tailored appropriate to the helicopter type, using exercises considered more demanding for the student. This should include engine-out handling and engine-out operations in addition to representative exercises from the type transition course.

(j) The applicant should be required to plan, brief, train and debrief sessions using all relevant training techniques.

Helicopter training

(k) The applicant for a TRI(H) certificate should receive instruction in an FSTD to a satisfactory level in:

(1) left hand seat familiarisation, and in addition right hand seat familiarisation where instruction is to be given to co-pilots operating in the left hand seat, which should include at least the following as pilot flying:

(i) pre-flight preparation and use of checklists;

(ii) taxiing: ground and air;

(iii) take-off and landings;

(iv) engine failure during take-off, before DPATO;

(v) engine failure during take-off, after DPATO;

(vi) engine inoperative approach and go-around;

(vii) one engine simulated inoperative landing;

(viii) autorotation to landing or power recovery;

(ix) other emergency and abnormal operating procedures (as necessary);

(x) instrument departure, approach and go-around with one engine simulated inoperative should be covered where TRI(H) privileges include giving instrument instruction for the extension of an IR(H) to additional types.

(2) helicopter training techniques:

(i) methods for giving appropriate commentary;

(ii) instructor demonstrations of critical manoeuvres with commentary;

(iii) particularities and safety considerations associated with handling the helicopter in critical manoeuvres such as one-engine-inoperative and autorotation exercises;

(iv) where relevant, the conduct of instrument training with particular emphasis on weather restrictions, dangers of icing and limitations on the conduct of critical manoeuvres in instrument meteorological conditions;

(v) intervention strategies developed from situations role-played by a TRI(H) course instructor, taken from but not limited to:

(A) incorrect helicopter configuration;

(B) over controlling;

(C) incorrect control inputs;

(D) excessive flare close to the ground;

(E) one-engine-inoperative take-off and landings;

(F) incorrect handling of autorotation;

(G) static or dynamic rollover on take-off or landing;

(H) too high on approach with associated danger of vortex ring or settling with power;

(I) incapacitation;

(J) abnormal and emergency procedures and appropriate methods and minimum altitudes for simulating failures in the helicopter;

(K) failure of the driving engine during OEI manoeuvres.

(l) Upon successful completion of the training above, the applicant should receive sufficient training in an helicopter in-flight under the supervision of a TRI(H) to a level where the applicant is able to conduct the critical items of the type rating course to a safe standard. Of the minimum course requirements of 5 hours flight training for a SP helicopter or 10 hours for a MP helicopter, up to 3 hours of this may be conducted in an FSTD.

Training where no FSTD exists

(m) Where no FSTD exists for the type for which the TRI(H) certificate is sought, a similar course of training should be conducted in the applicable helicopter type. This includes all elements listed under sub paragraphs (k)(1) and (2) of this AMC, the FSTD elements being replaced with appropriate exercises in a helicopter of the applicable type, subject to any restrictions placed on the conduct of critical

exercises associated with helicopter flight manual limitations and safety considerations.

AMC1 FCL.930.CRI CRI Training course

General

(a) The aim of the CRI training course is to train aircraft licence holders to the level of competence defined in FCL.920 and adequate to a CRI.

(b) The training course should be designed to give adequate training to the applicant in theoretical knowledge instruction, flight instruction and FSTD instruction to instruct for any class or type rating for non-complex non-high performance SP aeroplanes for which the applicant is qualified.

(c) The flight training should be aimed at ensuring that the applicant is able to teach the air exercises safely and efficiently to students undergoing a course of training for the issue of a class or type rating for non-complex non-high performance SP aeroplanes. The flight training may take place on the aeroplane or an FFS.

(d) 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.

(e) The student instructor should learn how to identify common errors and how to correct them properly, which should be emphasised at all times.

Content

(f) The training course consists of three parts:

(1) Part 1: teaching and learning that should follow the content of AMC1 FCL.920;

(2) Part 2: technical theoretical knowledge instruction (technical training);

(3) Part 3: flight instruction.

Part 1

The content of the teaching and learning part of the FI training course, as established in AMC1 FCL.930.FI, should be used as guidance to develop the course syllabus.

Part 2

This syllabus is concerned only with the training on ME aeroplanes. Therefore, other knowledge areas, common to both SE and ME aeroplanes, should be revised as necessary to cover the handling and operating of the aeroplane with all engines operative, using the applicable sections of the ground subjects syllabus for the FI course. 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 ME training course. This part will include the long briefings for the air exercises.

Theoretical knowledge instruction syllabus

Suggested breakdown of course classroom hours:

Tuition hours	Practice in class	Topic	Internal progress test
1.00		Aviation legislation	1.00

Tuition hours	Practice in class	Topic	Internal progress test
2.00		Performance, all engines operating, including mass and balance	
2.00		Asymmetric flight Principles of flight	
2.00	2.00	Control in asymmetric flight Minimum control and safety speeds Feathering and un-feathering	
2.00		Performance in asymmetric flight	1.00
2.00		Specific type of aeroplane – operation of systems. Airframe and engine limitations	1.00
4.00	5.00	Briefings for air exercises progress Internal progress	
15.00	7.00		3.00
Course total	25.00 (including progress test)		

General subjects

(a) Air legislation:

(1) aeroplane performance group definitions;

(2) methods of factoring gross performance.

(b) Asymmetric power flight;

(c) Principles of flight;

(d) The problems:

(1) asymmetry;

(2) control;

(3) performance;

(e) The forces and couples:

(1) offset thrust line;

(2) asymmetric blade effect;

(3) offset drag line;

(4) failed engine propeller drag;

(5) total drag increase;

(6) asymmetry of lift;

(7) uneven propeller slipstream effect;

(8) effect of yaw in level and turning flight;

(9) thrust and rudder side force couples;

(10) effect on moment arms.

(f) Control in asymmetric power flight:
  (1) use, misuse and limits of:
    (i) rudder;
    (ii) aileron;
    (iii) elevators.
  (2) effect of bank or sideslip and balance;
  (3) decrease of aileron and rudder effectiveness;
  (4) fin stall possibility;
  (5) effect of IAS and thrust relationship;
  (6) effect of residual unbalanced forces;
  (7) foot loads and trimming.

(g) Minimum control and safety speeds:
  (1) minimum control speed (V_{mc});
  (2) definition;
  (3) origin;
  (4) factors affecting (V_{mc}):
    (i) thrust;
    (ii) mass and centre of gravity position;
    (iii) altitude;
    (iv) landing gear;
    (v) flaps;
    (vi) cowl flaps or cooling gills;
    (vii) turbulence or gusts;
    (viii) pilot reaction or competence;
    (ix) banking towards the operating engine;
    (x) drag;
    (xi) feathering;
    (xii) critical engine.
  (5) take-off safety speed;
  (6) definition or origin of V_2;
  (7) other relevant V codes;

(h) Aeroplane performance: one engine inoperative:
  (1) effect on excess power available;
  (2) SE ceiling;
  (3) cruising, range and endurance;
  (4) acceleration and deceleration;

(5) zero thrust, definition and purpose;

(i) Propellers:

(1) variable pitch: general principles;

(2) feathering and un-feathering mechanism and limitations (for example minimum RPM);

(j) Specific aeroplane type;

(k) Aeroplane and engine systems:

(1) operation normal;

(2) operation abnormal;

(3) emergency procedures.

(l) Limitations: airframe:

(1) load factors;

(2) landing gear and flap limiting speeds (V_{lo} and V_{fe});

(3) rough air speed V_{ra});

(4) maximum speeds (V_{no} and V_{ne}).

(m) Limitations: engine:

(1) RPM and manifold pressure;

(2) oil temperature and pressure;

(3) emergency procedures.

(n) Mass and balance:

(to be covered in conjunction with the flight manual or equivalent document (for example owner's manual or pilot's operating handbook))

(1) mass and balance documentation for aeroplane type;

(2) revision of basic principles;

(3) calculations for specific aeroplane type.

(o) Mass and performance:

(to be covered in conjunction with the flight manual or equivalent document (for example owner's manual or pilot's operating handbook))

(1) calculations for specific aeroplane type (all engines operating);

(2) take-off run;

(3) take-off distance;

(4) accelerate and stop distance;

(5) landing distance;

(6) landing run;

(7) take-off or climb out flight path;

(8) calculations for specific aeroplane type (one engine operating);

(9) climb out flight path;

(10) landing distance;

(11) landing run.

Part 3

Flight instruction syllabus: normal flight

(a) This part is similar to the air exercise sections of the SE FI course, including 'Introduction to instrument flying' except that the objectives, airmanship considerations and common errors are related to the operation of an ME aeroplane.

(b) The purpose of this part is to acquaint the applicant with the teaching aspects of the operational procedures and handling of an ME aeroplane with all engines functioning.

(c) The following items should be covered:

(1) aeroplane familiarisation;

(2) pre-flight preparation and aeroplane inspection;

(3) engine starting procedures;

(4) taxiing;

(5) pre take-off procedures;

(6) the take-off and initial climb:

(i) into wind;

(ii) crosswind;

(iii) 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:

(i) into wind;

(ii) croswind;

(iii) short field;

(16) mislanding and going round again;

(17) actions after flight.

Air exercises

(d) The following air exercises are developments of the basic SE syllabus which are to be related to the handling of ME types 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.

Exercise 1: Familiarisation with the aeroplane

(a) Long briefing objectives:

(1) introduction to the aeroplane;

(2) explanation of the cockpit layout;

(3) systems and controls;

(4) aeroplane power plant;

(5) checklists and drills;

(6) differences when occupying the instructor's seat;

(7) emergency drills:

(i) action in event of fire in the air and on the ground;

(ii) escape drills: location of exits and use of emergency equipment (for example fire extinguishers, etc.).

(8) pre-flight preparation and aeroplane inspection:

(i) aeroplane documentation;

(ii) external checks;

(iii) internal checks;

(iv) harness, seat or rudder pedal adjustment;

(9) engine starting procedures:

(i) use of checklists;

(ii) checks before starting;

(iii) checks after starting.

(b) Air exercise:

(1) external features;

(2) cockpit layout;

(3) aeroplane systems;

(4) checklists and drills;

(5) action if fire in the air and on the ground;

(i) engine;

(ii) cabin;

(iii) electrical.

(6) systems failure (as applicable to type);

(7) escape drills (location and use of emergency equipment and exits);

(8) preparation for and action after flight:

(i) flight authorisation and aeroplane acceptance;

(ii) technical log or certificate of maintenance release;

(iii) mass and balance and performance considerations;

(iv) external checks;

(v) internal checks, adjustment of harness or rudder pedals;

(vi) starting and warming up engines;

(vii) checks after starting;

(viii) radio navigation and communication checks;

(ix) altimeter checks and setting procedures;

(x) power checks;

(xi) running down and switching off engines;

(xii) completion of authorisation sheet and aeroplane serviceability documents.

Exercise 2: Taxiing

(a) Long briefing objectives:

(1) pre-taxiing area precautions (greater mass: greater inertia);

(2) effect of differential power;

(3) precautions on narrow taxiways;

(4) pre take-off procedures:

(i) use of checklist;

(ii) engine power checks;

(iii) pre take-off checks;

(iv) instructor's briefing to cover the procedure to be followed should an emergency occur during take-off, for example engine failure.

(5) the take-off and initial climb:

(i) ATC considerations;

(ii) factors affecting the length of the take-off run or distance;

(iii) correct lift-off speed;

(iv) importance of safety speed;

(v) crosswind take-off, considerations and procedures;

(vi) short field take-off, considerations and procedures;

(vii) engine handling after take-off: throttle, pitch and engine synchronisation.

(6) climbing:

(i) pre-climbing checks;

(ii) engine considerations (use of throttle or pitch controls);

(iii) maximum rate of climb speed;

(iv) maximum angle of climb speed;

(v) synchronising the engines.

(b) Air exercise

(1) pre-taxing checks;

(2) starting, control of speed and stopping;

(3) control of direction and turning;

(4) turning in confined spaces;

(5) leaving the parking area;

(6) freedom of rudder movement (importance of pilot ability to use full rudder travel);

(7) instrument checks;

(8) emergencies (brake or steering failure);

(9) pre take-off procedures:

(i) use of checklist;

(ii) engine power and system checks;

(iii) pre take-off checks;

(iv) instructor's briefing if emergencies during take-off.

(10) the take-off and initial climb:

(i) ATC considerations;

(ii) directional control and use of power;

(iii) lift-off speed;

(iv) crosswind effects and procedure;

(v) short field take-off and procedure.

(vi) procedures after take-off (at an appropriate stage of the course):

(A) landing gear retraction;

(B) flap retraction (as applicable);

(C) selection of manifold pressure and RPM;

(D) engine synchronisation;

(E) other procedures (as applicable).

(11) climbing:

(i) pre-climbing checks;

(ii) power selection for normal and maximum rate climb;

(iii) engine and RPM limitations;

(iv) effect of altitude on manifold pressure, full throttle;

(v) levelling off: power selection;

(vi) climbing with flaps down;

(vii) recovery to normal climb;

(viii) en-route climb (cruise climb);

(ix) maximum angle of climb;

(x) altimeter setting procedures;

(xi) prolonged climb and use of cowl flaps or cooling gills;

(xii) instrument appreciation.

Exercise 3: Straight and level flight

(a) Long briefing objectives:

(1) selection of power: throttle or pitch controls;

(2) engine synchronisation;

(3) fuel consumption aspects;

(4) use of trimming controls: elevator and rudder (aileron as applicable);

(5) operation of flaps:

(i) effect on pitch attitude;

(ii) effect on air speed.

(6) operation of landing gear:

(i) effect on pitch attitude;

(ii) effect on air speed.

(7) use of mixture controls;

(8) use of alternate air or carburettor heat controls;

(9) operation of cowl flaps or cooling gills;

(10) use of cabin ventilation and heating systems;

(11) operation and use of the other systems (as applicable to type);

(12) descending:

(i) pre-descent checks;

(ii) normal descent;

(iii) selection of throttle or pitch controls;

(iv) engine cooling considerations;

(v) emergency descent procedure.

(13) turning:

(i) medium turns;

(ii) climbing and descending turns;

(iii) steep turns (45 ° of bank or more).

(b) Air exercise:

(1) at normal cruising power:

(i) selection of cruise power;

(ii) manifold pressure or RPM;

(iii) engine synchronisation;

(iv) use of trimming controls;

(v) performance considerations: range or endurance.

(2) instrument appreciation;

(3) operation of flaps (in stages):

(i) air speed below Vf_e;

(ii) effect on pitch attitude;

(iii) effect on air speed.

(4) operation of landing gear:

(i) air speed below V_{lo} / V_{le};

(ii) effect on pitch attitude;

(iii) effect on air speed.

(5) use of mixture controls;

(6) use of alternate air or carburettor control;

(7) operation of cowl flaps or cooling gills;

(8) operation of cabin ventilation or heating systems;

(9) operation and use of other systems (as applicable to type);

(10) descending;

(i) pre-descent checks;

(ii) power selection: manifold pressure or RPM;

(iii) powered descent (cruise descent);

(iv) engine cooling considerations: use of cowl flaps or cooling gills;

(v) levelling off;

(vi) descending with flaps down;

(vii) descending with landing gear down;

(viii) altimeter setting procedure;

(ix) instrument appreciation;

(x) emergency descent:

(A) as applicable to type;

(B) limitations in turbulence V_{no}.

(11) turning:

(i) medium turns;

(ii) climbing and descending turns;

(iii) steep turns: 45 ° of ban;

(iv) instrument appreciation.

Exercise 4: Slow flight

(a) Long briefing objectives:

(1) aeroplane handling characteristics during slow flight: flight at V_{s1} and V_{so} +5 knots;

(2) simulated go-around from slow flight:

(i) at V_{sse} with flaps down;

(ii) note pitch trim change.

(3) stalling:

(i) power selection;

(ii) symptoms approaching the stall;

(iii) full stall characteristics;

(iv) recovery from the full stall;

(v) recovery at the incipient stall;

(vi) stalling and recovery in the landing configuration;

(vii) recovery at the incipient stage in the landing configuration.

(4) instrument flight (basic):

(i) straight and level;

(ii) climbing;

(iii) turning;

(iv) descending.

(5) emergency drills (not including engine failure), as applicable to type;

(6) circuit approach and landing:

(i) downwind leg:

(A) air speed below V_{fe};

(B) use of flaps (as applicable);

(C) pre-landing checks;

(D) position to turn onto base leg.

(ii) base leg:

(A) selection of power (throttle or pitch), flaps and trimming controls;

(B) maintenance of correct air speed.

(iii) final approach:

(A) power adjustments (early reaction to undershooting);

(B) use of additional flaps (as required);

(C) confirmation of landing gear down;

(D) selection ‘touch down’ point;

(E) air speed reduction to V_{at};

(F) maintenance of approach path.

(iv) landing:

(A) greater sink rate;

(B) longer landing distance and run;

(C) crosswind approach and landing;

(D) crosswind considerations;

(E) short field approach and landing;

(F) short field procedure: considerations.

(b) Air exercise

(1) safety checks;

(2) setting up and maintaining (flaps up);

(i) V_{s1} + 5 knots;

(ii) note aeroplane handling characteristics.

(3) setting up and maintaining (flaps down):

(i) V_{so} + 5 knots;

(ii) note aeroplane handling characteristics.

(4) simulated go-around from a slow flight with flaps:

(i) down and air speed not below V_{sse}, for example air speed at V_{sse} or V_{mca} + 10 knots;

(ii) increase to full power and enter a climb;

(iii) note pitch change.

(5) resume normal flight.

(6) stalling;

(i) selection of RPM;

(ii) stall symptoms;

(iii) full stall characteristics;

(iv) recovery from the full stall: care in application of power;

(v) recovery at the incipient stage;

(vi) stalling and recovery in landing configuration;

(vii) stall recovery at the incipient stage in the landing configuration.

(7) instrument flight (basic):

(i) straight and level;

(ii) climbing;

(iii) turning;

(iv) descending.

(8) emergency drills (not including engine failure), as applicable to type;

(9) circuit, approach and landing:

(i) downwind leg:

(A) control of speed (below V_{fe});

(B) flaps as applicable;

(C) pre-landing checks;

(D) control of speed and height;

(E) base leg turn.

(ii) base leg:

(A) power selection;

(B) use of flap and trimming controls;

(C) maintenance of correct air speed.

(iii) final approach:

(A) use of additional flap (as required);

(B) confirmation of landing gear down;

(C) selection of touchdown point;

(D) air speed reduction to V_{at};

(E) maintaining correct approach path: use of power.

(iv) landing:

(A) control of sink rate during flare;

(B) crosswind considerations;

(C) longer landing roll;

(D) short or soft field approach and landing;

(E) considerations and precautions.

(10) Asymmetric power flight.

During this part, special emphasis is to be placed on the:

(i) circumstances in which actual feathering and un-feathering practice will be done, for example safe altitude; compliance with regulations about minimum altitude or height for feathering practice, weather conditions, distance from nearest available aerodrome;

(ii) procedure to use for instructor and student co-operation, for example the correct use of touch drills and the prevention of misunderstandings, especially during feathering and un-feathering 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 or re-started or set at zero thrust and identifying each control and naming the engine it is going to affect;

(iii) consideration to be given to avoid over-working the operating engine, and the degraded performance when operating the aeroplane during asymmetric flight;

(iv) need to use the specific checklist for the aeroplane type.

Exercise 5: Flight on asymmetric power

Long briefing objectives:

(1) introduction to asymmetric flight:

(2) feathering the propeller: method of operation;

(3) effects on aeroplane handling at cruising speed;

(4) introduction to effects upon aeroplane performance;

(5) note foot load to maintain a constant heading (no rudder trim);

(6) un-feathering the propeller;

(7) return to normal flight finding the zero thrust setting;

(8) comparison of foot load when feathered and with zero thrust set.

(9) effects and recognition of engine failure in level flight;

(10) forces and the effects of yaw;

(11) types of failure:

(i) sudden or gradual;

(ii) complete or partial.

(12) yaw, direction and further effects of yaw;

(13) flight instrument indications;

(14) identification of failed engine;

(15) the couples and residual out of balance forces: resultant flight attitude;

(16) use of rudder to counteract yaw;

(17) use of aileron: dangers of misuse;

(18) use of elevator to maintain level flight;

(19) use of power to maintain a safe air speed and altitude;

(20) supplementary recovery to straight and level flight: simultaneous increase of speed and reduction in power;

(21) identification of failed engine: idle leg = idle engine;

(22) use of engine instruments for identification:

(i) fuel pressure or flow;

(ii) RPM gauge response effect of CSU action at lower and higher air speed;

(iii) engine temperature gauges.

(23) confirmation of identification: close the throttle of identified failed engine;

(24) effects and recognition of engine failure in turns;

(25) identification and control;

(26) side forces and effects of yaw.

(27) During turning flight:

(i) effect of ‘inside’ engine failure: effect sudden and pronounced;

(ii) effect of 'outside' engine failure: effect less sudden and pronounced;

(iii) the possibility of confusion in identification (particularly at low power):

(A) correct use of rudder;

(B) possible need to return to lateral level flight to confirm correct identification.

(iv) visual and flight instrument indications;

(v) effect of varying speed and power;

(vi) speed and thrust relationship;

(vii) at normal cruising speed and cruising power: engine failure clearly recognised;

(viii) at low safe speed and climb power: engine failure most positively recognised;

(ix) high speed descent and low power: possible failure to notice asymmetry (engine failure).

(28) Minimum control speeds:

(i) 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 V_{mca}. The purpose of the exercise is to continue the gradual introduction of a student to control an aeroplane in asymmetric power flight during extreme or critical situations. It is not a demonstration of V_{mca}.

(ii) 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};

(iii) Establish a minimum control speed for each asymmetrically disposed engine to establish critical engine (if applicable);

(iv) Effects on minimum control speeds of:

(A) bank;

(B) zero thrust setting;

(C) take-off configuration:

(a) landing gear down and take-off flap set;

(b) landing gear up and take-off flap set.

Note: it is important to appreciate that the use of 5° of bank towards the operating engine produces a lower V_{mca} and also a better performance than that obtained with the wings held level. It is now normal for manufacturers to use 5° of bank in this manner when determining the V_{mca} for the specific type. Thus, the V_{mca} quoted in the aeroplane manual will have been obtained using the technique.

(29) Feathering and un-feathering:

(i) minimum heights for practising feathering or un-feathering drills;

(ii) engine handling: precautions (overheating, icing conditions, priming, warm-up, method of simulating engine failure: reference to aircraft engine manual and service instructions and bulletins).

(30) Engine failure procedure:

(i) 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.

(ii) flight phase:

(A) in cruising flight;

(B) critical phase such as immediately after take-off or during the approach to landing or during a go-around.

(31) Aircraft type:

Variations will inevitably occur in the order of certain drills and checks due to differences between aeroplane types and perhaps between models of the same type, and the flight manual or equivalent document (for example owner's manual or pilot's operating handbook) is to be consulted to establish the exact order of these procedures.

For example, one flight manual or equivalent document (for example owner's manual or pilot's operating handbook) may call for the raising of flaps and landing gear before 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 aeroplanes, 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 actions' 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 manual or equivalent document (for example owner's manual or pilot's operating handbook) for the specific aeroplane type being used on the course.

(32) In-flight engine failure in cruise or other flight phase not including take -off or landing:

(i) immediate actions:

(A) recognition of asymmetric condition and control of the aircraft;

(B) identification and confirmation of failed engine:

(a) idle leg = idle engine;

(b) closing of throttle for confirmation.

(C) cause and fire check:

(a) typical reasons for failure;

(b) methods of rectification.

(D) feathering decision and procedure:

(a) reduction of other drag;

(b) need for speed but not haste;

(c) use of rudder trim.

(ii) subsequent actions;

(A) live engine:

(a) temperature, pressures and power;

(b) remaining services;

(c) electrical load: assess and reduce as necessary;

(d) effect on power source for air driven instruments;

(e) landing gear;

(f) flaps and other services.

(B) re-plan flight:

(a) ATC and weather;

(b) terrain clearance, SE cruise speed;

(c) decision to divert or continue.

(C) fuel management: best use of remaining fuel;

(D) dangers of re-starting damaged engine;

(E) action if unable to maintain altitude: effect of altitude on power available;

(F) effects on performance;

(G) effects on power available and power required;

(H) effects on various airframe configuration and propeller settings;

(I) use of flight manual or equivalent document (for example owner's manual or pilot's operating handbook):

(a) cruising;

(b) climbing: ASI colour coding (blue line);

(c) descending;

(d) turning.

(J) 'live' engine limitations and handling;

(K) take-off and approach: control and performance.

(33) Significant factors:

(i) significance of take-off safety speed:

(A) effect of landing gear, flap, feathering, take-off, trim setting, systems for operating landing gear and flaps;

(B) effect on mass, altitude and temperature (performance).

(ii) significance of best SE climb speed (V_{yse}):

(A) acceleration to best engine climb speed and establishing a positive climb;

(B) relationship of SE climb speed to normal climb speed;

(C) action if unable to climb.

(iii) significance of asymmetric committal height and speed: action if baulked below asymmetric committal height.

(34) Engine failure during take-off:

(i) below V_{mca} or unstick speed:

(A) accelerate or stop distance considerations;

(B) prior use of flight manual data if available.

(ii) above V_{mca} or unstick speed and below safety speed;

(iii) immediate re-landing or use of remaining power to achieve forced landing;

(iv) considerations:

(A) degree of engine failure;

(B) speed at the time;

(C) mass, altitude and temperature (performance);

(D) configuration;

(E) length of runway remaining;

(F) position of any obstacles ahead.

(35) Engine failure after take-off:

(i) simulated at a safe height and at or above take-off safety speed;

(ii) considerations:

(A) need to maintain control;

(B) use of bank towards operating engine;

(C) use of available power achieving best SE climb speed;

(D) mass, altitude, temperature (performance);

(E) effect of prevailing conditions and circumstances.

(36) Immediate actions: maintenance of control, including air speed and use of power:

(i) recognition of asymmetric condition;

(ii) identification and confirmation of failed engine;

(iii) feathering and removal of drag (procedure for type);

(iv) establishing best SE climb speed.

(37) Subsequent actions: whilst carrying out an asymmetric power climb to the downwind position at SE best rate of climb speed:

(i) cause and fire check;

(ii) live engine, handling considerations;

(iii) remaining services;

(iv) ATC liaison;

(v) fuel management.

Note: these procedures are applicable to aeroplane type and flight situation.

(38) Significance of asymmetric committal height:

(i) 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 CS/JAR/FAR 23 aeroplanes 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 aeroplane 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 aeroplane established in a climb at V_{yse} a minimum height (often referred to as 'Asymmetric committal height') is to be selected, below which the pilot should not attempt to take the aeroplane round again for another circuit. This height will be compatible with the aeroplane 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.

(ii) circuit approach and landing on asymmetric power:

(A) definition and use of asymmetric committal height;

(B) use of standard pattern and normal procedures;

(C) action if unable to maintain circuit height;

(D) speed and power settings required;

(E) decision to land or go-around at asymmetric committal height: factors to be considered.

(iii) undershooting importance of maintaining correct air speed (not below V_{yse}).

(39) Speed and heading control:

(i) height, speed and power relationship: need for minimum possible drag;

(ii) establishing positive climb at best SE rate of climb speed:

(A) effect of availability of systems, power for flap and landing gear;

(B) operation and rapid clean up.

Note 1: The air speed at which the decision is made to commit the aeroplane to a landing or to go-around should normally be the best SE 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.

(40) Engine failure during an all engines approach or missed approach:

(i) use of asymmetric committal height and speed considerations;

(ii) speed and heading control;

(iii) 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.

(41) Instrument flying on asymmetric power:

(i) considerations relating to aircraft performance during:

(A) straight and level flight;

(B) climbing and descending;

(C) standard rate turns;

(D) level, climbing and descending turns including turns onto pre-selected headings.

(ii) availability of vacuum operated instruments;

(iii) availability of electrical power source.

Air exercise

This section covers the operation of a SP ME aeroplane when one engine has failed and it is applicable to all such light piston aeroplanes. Checklists should be used as applicable.

(1) introduction to asymmetric flight:

(2) close the throttle of one engine;

(3) feather its propeller;

(4) effects on aeroplane handling at cruising speed;

(5) effects on aeroplane performance for example cruising speed and rate of climb;

(6) note foot load to maintain a constant heading;

(7) un-feather the propeller;

(8) return to normal flight finding the zero thrust throttle setting;

(9) comparison of foot load when feathered and with zero thrust set.

(10) effects and recognition of engine failure in level flight with the aeroplane straight and level at cruise speed:

(i) slowly close the throttle of one engine;

(ii) note yaw, roll and spiral descent.

(11) return to normal flight:

(i) close throttle of other engine;

(ii) note same effects in opposite direction.

(12) methods of control and identification of failed engine close one throttle and maintain heading and level flight by use of:

(i) rudder to control yaw;

(ii) aileron to hold wings level;

(iii) elevators to maintain level flight;

(iv) power (as required) to maintain air speed and altitude.

(13) alternative or supplementary method of control:

(i) simultaneously;

(ii) lower aeroplane nose to increase air speed;

(iii) reduce power;

(iv) loss of altitude: inevitable.

(14) identification of failed engine: idle foot = idle engine;

(15) use of instruments for identification:

(i) fuel pressure or fuel flow;

(ii) RPM gauge or CSU action may mask identification;

(iii) engine temperature gauges.

(16) confirmation of identification: close the throttle of the identified failed engine;

(17) effects and recognition of engine failure in turns and effects of 'inside' engine failure:

(i) more pronounced yaw;

(ii) more pronounced roll;

(iii) more pronounced pitch down.

(18) effects of 'outside' engine failure:

(i) less pronounced yaw;

(ii) less pronounced roll;

(iii) less pronounced pitch down.

(19) possibility of confusion in identification:

(i) use of correct rudder application;

(ii) return to lateral level flight if necessary.

(20) flight instrument indications;

(21) effect of varying speed and power;

(22) failure of one engine at cruise speed and power: engine failure clearly recognised;

(23) failure of one engine at low speed and high power (not below Vsse): engine failure most positively recognised;

(24) failure of one engine at higher speeds and low power: possible failure to recognise engine failure;

(25) minimum control speeds;

(26) establish the V_{yse}:

(i) select maximum permitted manifold pressure and RPM;

(ii) close the throttle on one engine;

(iii) raise the aeroplane nose and reduce the air speed;

(iv) note the air speed when maximum rudder deflection is being applied and when directional control can no longer be maintained;

(v) lower the aeroplane nose and reduce power until full directional control is regained;

(vi) the lowest air speed achieved before the loss of directional control will be the V_{mc} for the flight condition;

(vii) repeat the procedure closing the throttle of the other engine;

(viii) the higher of these two air speeds will identify the most critical engine to fail.

Note: 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, for example when the stall warning device operates, for the particular aeroplane configuration and flight conditions. On no account should the aeroplane be allowed to decelerate to a lower air speed.

(27) establish the effect of using 5° of bank at V_{mc}:

(i) close the throttle of one engine;

(ii) increase to full power on the operating engine;

(iii) using 5° of bank towards the operating engine reduce speed to the V_{mc};

(iv) note lower V_{mc} when 5° of bank is used.

(28) 'in-flight' engine failure procedure;

(29) in cruise and other flight circumstances not including take-off and landing.

(30) Immediate actions: maintenance of control including air speed and use of power:

(i) identification and confirmation of failed engine;

(ii) failure cause and fire check;

(iii) feathering decision and implementation;

(iv) reduction of any other drag, for example flaps, cowl flaps etc.;

(v) retrim and maintain altitude.

(31) Subsequent actions:

(i) live engine:

(A) oil temperature, pressure, fuel flow and power;

(B) remaining services;

(C) electrical load: assess and reduce as necessary;

(D) effect on power source for air driven instruments;

(E) landing gear;

(F) flaps and other services.

(ii) re-plan flight:

(A) ATC and weather;

(B) terrain clearance;

(C) SE cruise speed;

(D) decision to divert or continue;

(iii) fuel management: best use of fuel;

(iv) dangers of re-starting damaged engine;

(v) action if unable to maintain altitude:

(A) adopt V_{yse};

(B) effect of altitude on power available.

(vi) effects on performance;

(vii) effects on power available and power required;

(viii) effects on various airframe configurations and propeller settings;

(ix) use of flight manual or equivalent document (for example owner's manual or pilot's operating handbook):

(A) cruising;

(B) climbing: ASI colour coding (blue line);

(C) descending;

(D) turning.

(x) 'live' engine limitations and handling;

(xi) take-off and approach: control and handling;

Note: to be done at a safe height away from the circuit;

(xii) take-off case with landing gear down and take-off flap set (if applicable);

(xiii) 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 aeroplane clean and zero thrust set. Thereafter to achieve a positive climb);

(xiv) significance of flight below safety speed (below safety speed and above V_{mca}. 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);

(xv) significance of best SE climb speed (the ability to achieve the best rate of climb on one engine with minimum delay).

(32) Significance of asymmetric committal height:

(i) the ability to maintain or accelerate to the best SE rate of climb speed and to maintain heading whilst cleaning up with perhaps a slight height loss before climbing away;

(ii) below this height, the aeroplane is committed to continue the approach to a landing.

(33) Engine failure during take-off run and below safety speed briefing only;

(34) 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 SE climb in the prevailing conditions.

(i) immediate actions:

(A) control of direction and use of bank;

(B) control of air speed and use of power;

(C) recognition of asymmetric condition;

(D) identification and confirmation of failed engine feathering and reduction of drag (procedure for type);

(E) re-trim;

(ii) subsequent actions: whilst carrying out an asymmetric power climb to the downwind position at SE best rate of climb speed:

(A) cause and fire check;

(B) live engine, handling considerations;

(C) drills and procedures applicable to aeroplane type and flight situation;

(D) ATC liaison;

(E) fuel management.

(35) Asymmetric circuit, approach and landing;

(i) downwind and base legs:

(A) use of standard pattern;

(B) normal procedures;

(C) landing gear and flap lowering considerations;

(D) position for base leg;

(E) live engine handling;

(F) air speed and power settings;

(G) maintenance of height.

(ii) final approach:

(A) asymmetric committal height drill;

(B) control of air speed and descent rate;

(C) flap considerations.

(iii) going round again on asymmetric power (missed approach):

(A) not below asymmetric committal height;

(B) speed and heading control;

(C) reduction of drag, landing gear retraction;

(D) maintaining V_{yse};

(E) establish positive rate of climb.

(36) 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:

(i) speed and heading control;

(ii) reduction of drag flap;

(iii) decision to attempt landing or go-around;

(iv) control of descent rate if approach is continued;

(v) 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.

(37) Instrument flying on asymmetric power;

(38) Flight instrument checks and services available:

(i) straight and level flight;

(ii) climbing and descending;

(iii) standard rate turns;

(iv) level, climbing and descending turns including turns onto pre-selected headings.

EXERCISE 6: UPRT

Instructors should have the specific competence to provide UPRT during the type rating course, including the ability to demonstrate knowledge and understanding of the type-specific upset recovery procedures and of the recommendations that are developed by the OEMs. Therefore, during the CRI training course, the student instructor should:

(a) be able to apply the correct upset recovery techniques for the specific aeroplane type;
(b) understand the importance of applying type-specific OEM procedures for recovery manoeuvres;
(c) be able to distinguish between the applicable SOPs and OEM recommendations (if available);
(d) understand the capabilities and limitations of the FSTDs that are used for UPRT;
(e) ensure that the training remains within the FSTD training envelope to avoid the risk of negative transfer of training;
(f) understand and be able to use the IOS of the FSTD in the context of providing effective UPRT;
(g) understand and be able to use the available FSTD instructor tools to provide accurate feedback on pilot performance;
(h) understand the importance of adhering to the FSTD UPRT scenarios that are validated by the training programme developer; and
(i) understand the missing critical human factor aspects due to the limitations of the FSTD, and convey this to the student pilot(s) receiving the training.

AMC1 FCL.940.CRI CRI Revalidation and renewal

Refresher training

Paragraph (c)(1) of FCL.940.CRI determine that an applicant for renewal of a CRI certificate shall complete refresher training as a CRI at an ATO. Paragraph (a)(2) also establishes that an applicant for revalidation of the CRI certificate that has not completed a minimum amount of instruction hours (established in paragraph (a)(1)) during the validity period of the certificate shall undertake refresher training at an ATO for the revalidation of the certificate. The amount of refresher training needed should

be determined on a case by case basis by the ATO, taking into account the following factors:

(1) the experience of the applicant;

(2) whether the training is for revalidation or renewal;

(3) the amount of time lapsed since the last time the applicant has conducted training, in the case of revalidation, or since the certificate has lapsed, in the case of renewal. The amount of training needed to reach the desired level of competence should increase with the time lapsed.

Once the ATO has determined the needs of the applicant, it should develop an individual training programme that should be based on the CRI training course and focus on the aspects where the applicant has shown the greatest needs.

AMC1 FCL.930.IRI IRI Training course

General

The aim of the IRI training course is to train aircraft licence holders to the level of competence defined in FCL.920, and adequate for an IRI

The IRI training 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.

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:

(1) refresh and bring up to date the technical knowledge of the student instructor;

(2) train pilots in accordance with the requirements of the modular instrument flying training course;

(3) 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;

(4) ensure that the student instrument rating instructor's flying is of a sufficiently high standard.

In part 3 some of the air exercises of the flight instruction syllabus of this AMC may be combined in the same flight.

During the training course the applicants should be made aware of their own attitudes to the important aspects of flight safety. Improving safety awareness should be a fundamental objective throughout the training course. It will be of major importance for the training course to aim at giving applicants the knowledge, skills and attitudes

relevant to an instructor's task. To achieve this, the course curriculum, in terms of objectives, should comprise at least the following areas.

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.

The student instructor should learn how to identify common errors and how to correct them properly, which should be emphasised at all times.

Content

The training course consists of three parts:

(1) Part 1: teaching and learning that should follow the content of AMC1 FCL.920.

(2) Part 2: instrument technical theoretical knowledge instruction (technical training).

(3) Part 3: flight instruction.

Part 1

The content of the teaching and learning part of the FI training course, as established in AMC1 FCL.930.FI, should be used as guidance to develop the course syllabus.

Part 2

Theoretical knowledge instruction syllabus

The instrument theoretical knowledge instruction should comprise not less than 10 hours training to include the revision of instrument theoretical knowledge, the preparation of lesson plans and the development of classroom instructional skills to enable the IRI to instruct the instrument theoretical knowledge syllabus.

All the subject detail contained in the instrument theoretical knowledge instruction syllabus and flight instruction 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:

(1) refresh and bring up to date the technical knowledge of the student instructor;

(2) train pilots in accordance with the requirements of the modular instrument flying training course;

(3) 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

(4) ensure that the student instrument rating instructor's flying is of a sufficiently high standard.

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.

General subjects

Physiological and psychological factors:

(1) the senses;

(2) spatial disorientation;

(3) sensory illusions;

(4) stress.

Flight instruments:

(1) air speed indicator;

(2) altimeter;

(3) vertical speed indicator;

(4) attitude indicator;

(5) heading indicator;

(6) turn and slip indicator;

(7) magnetic compass;

(8) in relation to the above instruments the following items should be covered:

(i) principles of operation;

(ii) errors and in-flight serviceability checks;

(iii) system failures.

Radio navigation aids:

(1) basic radio principles;

(2) use of VHF RTF channels;

(3) the Morse code;

(4) basic principles of radio aids;

(5) use of VOR;

(6) ground and aeroplane equipment;

(7) use of NDB/ADF;

(8) ground and aeroplane equipment;

(9) use of VHF/DF;

(10) radio detection and ranging (radar);

(11) ground equipment;

(12) primary radar;

(13) secondary surveillance radar;

(14) aeroplane equipment;

(15) transponders;

(16) precision approach system;

(17) other navigational systems (as applicable) in current operational use;

(18) ground and aeroplane equipment;

(19) use of DME;

(20) ground and aeroplane equipment;

(21) marker beacons;

(22) ground and aeroplane equipment;

(23) pre-flight serviceability checks;

(24) range, accuracy and limitations of equipment.

Flight planning considerations;

Aeronautical information publications:

(1) the training course 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.

(2) AIP

(3) NOTAM class 1 and 2;

(4) AIC;

(5) information of an operational nature;

(6) the rules of the air and ATS;

(7) visual flight rules and instrument flight rules;

(8) flight plans and ATS messages;

(9) use of radar in ATS;

(10) radio failure;

(11) classification of airspace;

(12) airspace restrictions and hazards;

(13) holding and approach to land procedures;

(14) precision approaches and non-precision approaches;

(15) radar approach procedures;

(16) missed approach procedures;

(17) visual manoeuvring after an instrument approach;

(18) conflict hazards in uncontrolled airspace;

(19) communications;

(20) types of services;

(21) extraction of AIP data relating to radio aids;

(22) charts available;

(23) en-route;

(24) departure and arrival;

(25) instrument approach and landing;

(26) amendments, corrections and revision service.

flight planning general:

(1) the objectives of flight planning;

(2) factors affecting aeroplane and engine performance;

(3) selection of alternate(s);

(4) obtaining meteorological information;

(5) services available;

(6) meteorology briefing;

(7) telephone or electronic data processing;

(8) actual weather reports (TAFs, METARs and SIGMET messages);

(9) the route forecast;

(10) the operational significance of the meteorological information obtained (including icing, turbulence and visibility);

(11) altimeter considerations;

(12) definitions of:

(i) transition altitude;

(ii) transition level;

(iii) flight level;

(iv) QNH;

(v) regional QNH;

(vi) standard pressure setting;

(vii) QFE.

(13) altimeter setting procedures;

(14) pre-flight altimeter checks;

(15) take-off and climb;

(16) en-route;

(17) approach and landing;

(18) missed approach;

(19) terrain clearance;

(20) selection of a minimum safe en-route altitude;

(21) IFR;

(22) preparation of charts;

(23) choice of routes and flight levels;

(24) compilation of flight plan or log sheet;

(25) log sheet entries;

(26) navigation ground aids to be used;

(27) frequencies and identification;

(28) radials and bearings;

(29) tracks and fixes;

(30) safety altitude(s);

(31) fuel calculations;

(32) ATC frequencies (VHF);

(33) tower, approach, en-route, radar, FIS, ATIS, and weather reports;

(34) minimum sector altitudes at destination and alternate aerodromes;

(35) determination of minimum safe descent heights or altitudes (decision heights) at destination and alternate aerodromes.

The privileges of the instrument rating:

(1) outside controlled airspace;

(2) within controlled airspace;

(3) period of validity and renewal procedures.

Part 3

Flight instruction syllabus

(a) An approved IRI course should comprise of at least 10 hours of flight instruction, of which a maximum of 8 hours may be conducted in an FSTD. A similar number of hours should be used for the instruction and practice of pre-flight and post-flight briefing for each exercise.

(b) The flight instruction should aim to ensure that the applicant is able to teach the air exercises safely and efficiently.

A. Aeroplanes

Long briefings and air exercises

Exercise 1: Instrument flying (basic)

(for revision, as deemed necessary by the instructor)

Long briefing objectives:

(1) flight instruments;

(2) physiological considerations;

(3) instrument appreciation:

(i) attitude instrument flight;

(ii) pitch indications;

(iii) bank indications;

(iv) different instrument presentations;

(v) introduction to the use of the attitude indicator;

(vi) pitch attitude;

(vii) bank attitude;

(viii) maintenance of heading and balanced flight;

(ix) instrument limitations (inclusive system failures).

(4) attitude, power and performance:

(i) attitude instrument flight;

(ii) control instruments;

(iii) performance instruments;

(iv) effect of changing power and configuration;

(v) cross-checking the instrument indications;

(vi) instrument interpretation;

(vii) direct and indirect indications (performance instruments);

(viii) instrument lag;

(ix) selective radial scan.

(5) the basic flight manoeuvres (full panel):

(i) straight and level flight at various air speeds and aeroplane configurations;

(ii) climbing;

(iii) descending;

(iv) standard rate turns;

(v) level, climbing and descending on to pre-selected headings.

Air exercise:

(1) instrument flying (basic);

(i) physiological sensations;

(ii) instrument appreciation;

(iii) attitude instrument flight;

(iv) pitch attitude;

(v) bank attitude;

(vi) maintenance of heading and balanced flight;

(vii) attitude instrument flight;

(viii) effect of changing power and configuration;

(ix) cross-checking the instruments;

(x) selective radial scan;

(2) the basic flight manoeuvres (full panel):

(i) straight and level flight at various air speeds and aeroplane configurations;

(ii) climbing;

(iii) descending;

(iv) standard rate turns;

(v) level, climbing and descending on to pre-selected headings.

Exercise 2: Instrument flying (advanced)

Long briefing objectives:

(1) full panel;

(2) 30° level turns;

(3) unusual attitudes: recoveries;

(4) transference to instruments after take-off;

(5) limited panel;

(6) basic flight manoeuvres;

(7) unusual attitudes: recoveries.

Air exercise:

(1) full panel;

(2) 30° level turns;

(3) unusual attitudes: recoveries;

(4) limited panel;

(5) repeat of the above exercises.

Exercise 3: Radio navigation (applied procedures): use of VOR

Long briefing objectives:

(1) availability of VOR stations en-route;

(2) station frequencies and identification;

(3) signal reception range;

(4) effect of altitude;

(5) VOR radials;
(6) use of OBS;
(7) to or from indicator;
(8) orientation;
(9) selecting radials;
(10) intercepting a pre-selected radial;
(11) assessment of distance to interception;
(12) effects of wind;
(13) maintaining a radial;
(14) tracking to and from a VOR station;
(15) procedure turns;
(16) station passage;
(17) use of two stations for obtaining a fix;
(18) pre-selecting fixes along a track;
(19) assessment of ground speed and timing;
(20) holding procedures;
(21) various entries;
(22) communication (R/T procedures and ATC liaison).

Air exercise:

(1) station selection and identification;
(2) orientation;
(3) intercepting a pre-selected radial;
(4) R/T procedures and ATC liaison;
(5) maintaining a radial inbound;
(6) recognition of station passage;
(7) maintaining a radial outbound;
(8) procedure turn;
(9) use of two stations to obtain a fix along the track;
(10) assessment of ground speed and timing;
(11) holding procedures and entries;
(12) holding at a pre-selected fix;
(13) holding at a VOR station.

Exercise 4: Radio navigation (applied procedures): use of NDB

Long briefing objectives:

(1) availability of an NDB facilities en-route;
(2) location, frequencies, tuning (as applicable) and identification codes;

(3) signal reception range;

(4) static interference;

(5) night effect;

(6) station interference;

(7) mountain effect;

(8) coastal refraction;

(9) orientation in relation to an NDB;

(10) homing;

(11) intercepting a pre-selected magnetic bearing and tracking inbound;

(12) station passage;

(13) tracking outbound;

(14) time and distance checks;

(15) use of two NDBs to obtain a fix or alternatively use of one NDB and one other navaid;

(16) holding procedures and various approved entries;

(17) communication (R/T procedures and ATC liaison).

Air exercise:

(1) selecting, tuning and identifying an NDB;

(2) ADF orientation;

(3) communication (R/T procedures and ATC liaison);

(4) homing;

(5) tracking inbound;

(6) station passage;

(7) tracking outbound;

(8) time and distance checks;

(9) intercepting a pre-selected magnetic bearing;

(10) determining the aeroplane's position from two NDBs or alternatively from one NDB and one other navaid;

(11) ADF holding procedures and various approved entries.

Exercise 5: Radio navigation (applied procedures): use of VHF/DF

Long briefing objectives:

(1) availability of VHF/DF facilities en-route;

(2) location, frequencies, station call signs and hours of operation;

(3) signal and reception range;

(4) effect of altitude;

(5) communication (R/T procedures and ATC liaison);

(6) obtaining and using types of bearings, for example QTE, QDM and QDR;

(7) homing to a station;

(8) effect of wind;

(9) use of two VHF/DF stations to obtain a fix (or alternatively one VHF/DF station and one other navaid);

(10) assessment of groundspeed and timing.

Air exercise:

(1) establishing contact with a VHF/DF station;

(2) R/T Procedures and ATC liaison;

(3) obtaining and using a QDR and QTE;

(4) homing to a station;

(5) effect of wind;

(6) use of two VHF/DF stations to obtain a fix (or alternatively one VHF/DF station and one other navaid);

(7) assessment of groundspeed and timing.

Exercise 6: Radio navigation (applied procedures): use of DME

Long briefing objectives:

(1) availability of DME facilities;

(2) location, frequencies and identification codes;

(3) signal reception range;

(4) slant range;

(5) use of DME to obtain distance, groundspeed and timing;

(6) use of DME to obtain a fix.

Air exercise:

(1) station selection and identification;

(2) use of equipment functions;

(3) distance;

(4) groundspeed;

(5) timing;

(6) DME arc approach;

(7) DME holding.

Exercise 7: Radio navigation (applied procedures): use of transponders (SSR)

Long briefing objectives:

(1) operation of transponders;

(2) code selection procedure;

(3) emergency codes;

(4) precautions when using airborne equipment.

Air exercise:

(1) operation of transponders;

(2) types of transponders;

(3) code selection procedure;

(4) emergency codes;

(5) precautions when selecting the required code.

Exercise 8: Radio navigation (applied procedures): use of en-route radar

Long briefing objectives:

(1) availability of radar services;

(2) location, station frequencies, call signs and hours of operation;

(3) AIP and NOTAMs;

(4) provision of service;

(5) communication (R/T, procedures and ATC liaison);

(6) airspace radar advisory service;

(7) emergency service;

(8) aircraft separation standards.

Air exercise:

(1) communication (R/T procedures and ATC liaison);

(2) establishing the service required and position reporting;

(3) method of reporting conflicting traffic;

(4) terrain clearance.

Exercise 9: Pre-flight and aerodrome departure and arrival procedures

Long briefing objectives:

(1) determining the serviceability of the aeroplane radio;

(2) navigation equipment;

(3) obtaining the departure clearance;

(4) setting up radio navaids before take-off for example VOR frequencies, required radials, etc.;

(5) aerodrome departure procedures, frequency changes;

(6) altitude and position reporting as required;

(7) SID procedures;

(8) obstacle clearance considerations.

Air exercise:

(1) radio equipment serviceability checks;

(2) departure clearance;

(3) navaid selection;

(4) frequencies, radials, etc.;

(5) aerodrome departure checks, frequency changes, altitude and position reports;

(6) SID procedures.

Exercise 10: Instrument approach: ILS approaches to specified minima and missed approach procedure

Long briefing objectives:

(1) precision approach charts;

(2) approach to the initial approach fix and minimum sector altitude;

(3) navaid requirements, for example radar, ADF, etc.;

(4) communication (ATC liaison and R/T phraseology);

(5) holding procedure;

(6) the final approach track;

(7) forming a mental picture of the approach;

(8) completion of aerodrome approach checks;

(9) initial approach procedure;

(10) selection of the ILS frequency and identification;

(11) obstacle clearance altitude or height;

(12) operating minima;

(13) achieving the horizontal and vertical patterns;

(14) assessment of distance, groundspeed time, and rate of descent from the final approach fix to the aerodrome;

(15) use of DME (as applicable);

(16) go-around and missed approach procedure;

(17) review of the published instructions;

(18) transition from instrument to visual flight (sensory illusions);

(19) visual manoeuvring after an instrument approach:

(i) circling approach;

(ii) visual approach to landing.

Air exercise:

(1) initial approach to the ILS;

(2) completion of approach planning;

(3) holding procedure;

(4) frequency selection and identification of ILS;

(5) review of the published procedure and minimum sector altitude;

(6) communication (ATC liaison and R/T phraseology);

(7) determination of operating minima and altimeter setting;

(8) weather consideration, for example cloud base and visibility;

(9) availability of runway lighting;

(10) ILS entry methods;

(11) radar vectors;

(12) procedural method;

(13) assessment of approach time from the final approach fix to the aerodrome;

(14) determination of:

(i) the descent rate on final approach;

(ii) the wind velocity at the surface and the length of the landing runway;

(iii) the obstruction heights to be borne in mind during visual manoeuvring after an instrument approach;

(15) circling approach;

(16) the approach:

(i) at the final approach fix;

(ii) use of DME (as applicable);

(iii) ATC liaison;

(iv) note time and establish air speed and descent rate;

(v) maintaining the localiser and glide path;

(vi) anticipation in change of wind velocity and its effect on drift;

(vii) decision height;

(17) runway direction;

(18) overshoot and missed approach procedure;

(19) transition from instrument to visual flight;

(20) circling approach;

(21) visual approach to landing.

Exercise 11: Instruments approach: NDB approaches to specified minima and missed approach procedures

Long briefing objectives:

(1) non-precision approach charts;

(2) initial approach to the initial approach fix and minimum sector altitude;

(3) ATC liaison;

(4) communication (ATC procedures and R/T phraseology);

(5) approach planning;

(6) holding procedure;

(7) the approach track;

(8) forming a mental picture of the approach;

(9) initial approach procedure;

(10) operating minima;

(11) completion of approach planning;

(12) achieving the horizontal and vertical patterns;

(13) assessment of distance, groundspeed time, and rate of descent from the final approach fix to the aerodrome;

(14) use of DME (as applicable);

(15) go-around and missed approach procedure;

(16) review of the published instructions;

(17) transition from instrument to visual flight (sensory illusions);

(18) visual manoeuvring after an instrument approach;

(19) circling approach;

(20) visual approach to landing.

Air exercise:

(1) completion of approach planning including determination of:

(i) descent rate from the final approach fix;

(ii) the wind velocity at the surface and length of the landing runway;

(iii) the obstruction heights to be borne in mind during visual manoeuvring after an instrument approach;

(2) circling approach;

(3) go-around and missed approach procedure;

(4) initial approach;

(5) frequency selection and identification;

(6) review of the published procedure and minimum safe sector altitude;

(7) ATC liaison and R/T phraseology;

(8) determination of decision height and altimeter setting;

(9) weather considerations, for example cloud base and visibility;

(10) availability of runway lighting;

(11) determination of inbound track;

(12) assessment of time from final approach fix to the missed approach point;

(13) ATC liaison;

(14) the outbound procedure (inclusive completion of pre-landing checks);

(15) the inbound procedure;

(16) re-check of identification code;

(17) altimeter setting re-checked;

(18) the final approach;

(19) note time and establish air speed and descent rate;

(20) maintaining the final approach track;

(21) anticipation of change in wind velocity and its effect on the drift;

(22) minimum descent altitude or height;

(23) runway direction;

(24) go-around and missed approach procedure;

(25) transition from instrument to visual flight (sensory illusions);

(26) visual approach.

Exercise 12: Radio navigation (applied procedures): use of GNSS (to be developed)

(a) Long briefing objectives: use of GNSS.

(b) Air exercise: use of GNSS.

B. Helicopters

Long briefings and air exercises

Exercise 1: Instrument flying (basic)

(for revision as deemed necessary by the instructor)

Long briefing objectives:

(1) flight instruments;

(2) physiological considerations;

(3) instrument appreciation:

(i) attitude instrument flight;

(ii) pitch indications;

(iii) bank indications;

(iv) different instrument presentations;

(v) introduction to the use of the attitude indicator;

(vi) pitch attitude;

(vii) bank attitude;

(viii) maintenance of heading and balanced flight;

(ix) instrument limitations (inc. system failures);

(4) attitude, power and performance:

(i) attitude instrument flight;

(ii) control instruments;

(iii) performance instruments;

(iv) effect of changing power;

(v) cross-checking the instrument indications;

(vi) instrument interpretation;

(vii) direct and indirect indications (performance instruments);

(viii) instrument lag;

(ix) selective radial scan;

(5) the basic flight manoeuvres (full panel):

(i) straight and level flight at various air speeds;

(ii) climbing;

(iii) descending;

(iv) standard rate turns;

(v) level, climbing and descending on to pre-selected headings.

Air exercise:

(1) physiological sensations;

(2) instrument appreciation;

(3) attitude instrument flight;

(4) pitch attitude;

(5) bank attitude;

(6) maintenance of heading and balanced flight;

(7) attitude instrument flight;

(8) effect of changing power;

(9) cross-checking the instruments;

(10) selective radial scan;

(11) the basic flight manoeuvres (full panel):

(i) straight and level flight at various air speeds and helicopter configurations;

(ii) climbing;

(iii) descending;

(iv) standard rate turns;

(v) level, climbing and descending on to pre-selected headings;

(vi) manoeuvring at minimum and maximum IMC speed.

Exercise 2: Instrument flying (advanced)

Long briefing objectives:

(1) full panel;

(2) 30° level turns;

(3) unusual attitudes: recoveries;

(4) transition to instruments after take-off;

(5) limited panel;

(6) basic flight manoeuvres;

(7) unusual attitudes: recoveries.

Air exercise:

(1) full panel;

(2) 30° level turns;

(3) unusual attitudes: recoveries;

(4) identification and recovery from low pitch steep bank and high pitch steep bank attitudes (at low and high power settings);

(5) limited panel;

(6) repeat of the above exercises.

Exercise 3: Radio navigation (applied procedures): use of VOR

Long briefing objectives:

(1) availability of VOR stations en-route;

(2) station frequencies and identification;

(3) signal reception range;

(4) effect of altitude;

(5) VOR radials;

(6) use of OBS;

(7) to and from indicator;

(8) orientation;

(9) selecting radials;

(10) intercepting a pre-selected radial;

(11) assessment of distance to interception;

(12) effects of wind;

(13) maintaining a radial;

(14) tracking to and from a VOR station;

(15) procedure turns;

(16) station passage;

(17) use of two stations for obtaining a fix;

(18) pre-selecting fixes along a track;

(19) assessment of ground speed and timing;

(20) holding procedures;

(21) various entries;

(22) communication (R/T procedures and ATC liaison).

Air exercise:

(1) station selection and identification;

(2) orientation;

(3) intercepting a pre-selected radial;

(4) R/T procedures and ATC liaison;

(5) maintaining a radial inbound;

(6) recognition of station passage;

(7) maintaining a radial outbound;

(8) procedure turns;

(9) use of two stations to obtain a fix along the track;

(10) assessment of ground speed and timing;

(11) holding procedures and entries;

(12) holding at a pre-selected fix;

(13) holding at a VOR station.

Exercise 4: Radio navigation (applied procedures): use of NDB

Long briefing objectives:

(1) availability of NDB facilities en-route;

(2) location, frequencies, tuning (as applicable) and identification codes;

(3) signal reception range;

(4) static interference;

(5) night effect;

(6) station interference;

(7) mountain effect;

(8) coastal refraction;

(9) orientation in relation to an NDB;

(10) homing;

(11) intercepting a pre-selected magnetic bearing and tracking inbound;

(12) station passage;

(13) tracking outbound;

(14) time and distance checks;

(15) use of two NDBs to obtain a fix or alternatively use of one NDB and one other navaid;

(16) holding procedures;

(17) communication (R/T procedures and ATC liaison).

Air exercise:

(1) selecting, tuning and identifying an NDB;

(2) ADF orientation;

(3) communication (R/T procedures and ATC liaison);

(4) homing;

(5) tracking inbound;

(6) station passage;

(7) tracking outbound;

(8) time and distance checks;

(9) intercepting a pre-selected magnetic bearing;

(10) determining the helicopter’s position from two NDBs or alternatively from one NDB and one other navaid;

(11) ADF holding procedures.

Exercise 5: Radio navigation (applied procedures): use of VHF/DF

Long briefing objectives:

(1) availability of VHF/DF facilities en-route;
(2) location, frequencies, station call signs and hours of operation;
(3) signal and reception range;
(4) effect of altitude;
(5) communication (R/T procedures and ATC liaison);
(6) obtaining and using types of bearings, for example QTE, QDM, QDR;
(7) homing to a station;
(8) effect of wind;
(9) use of two VHF/DF stations to obtain a fix (or alternatively one VHF/DF station and one other navaid);
(10) assessment of groundspeed and timing.

Air exercise:

(1) establishing contact with a VHF/DF station;
(2) R/T procedures and ATC liaison;
(3) obtaining and using a QDR and QTE;
(4) homing to a station;
(5) effect of wind;
(6) use of two VHF/DF stations to obtain a fix (or alternatively one VHF/DF station and one other navaid);
(7) assessment of groundspeed and timing.

Exercise 6: Radio navigation (applied procedures): use of DME

Long briefing objectives:

(1) availability of DME facilities;
(2) location, frequencies and identification codes;
(3) signal reception range;
(4) slant range;
(5) use of DME to obtain distance, groundspeed and timing;
(6) use of DME to obtain a fix;

Air exercise:

(1) station selection and identification;
(2) use of equipment functions;
(3) distance;
(4) groundspeed;
(5) timing;
(6) DME arc approach;
(7) DME holding.

Exercise 7: Radio navigation (applied procedures): use of transponders

Long briefing objectives:

(1) operation of transponders;

(2) code selection procedure;

(3) emergency codes;

(4) precautions when using airborne equipment.

Air exercise:

(1) operation of transponders;

(2) types of transponders;

(3) code selection procedure;

(4) emergency codes;

(5) precautions when selecting the required code.

Exercise 8: Radio navigation (applied procedures): use of en-route radar services

Long briefing objectives:

(1) availability of radar services;

(2) location, station frequencies, call signs and hours of operation;

(3) AIP and NOTAMS;

(4) provision of service;

(5) communication (R/T procedures and ATC liaison);

(6) airspace radar advisory service;

(7) emergency service;

(8) aircraft separation standards.

Air exercise:

(1) communication (R/T procedures and ATC liaison);

(2) establishing the service required and position reporting;

(3) method of reporting conflicting traffic;

(4) terrain clearance.

Exercise 9: Pre-flight and aerodrome departure and arrival procedures

Long briefing objectives:

(1) determining the serviceability of the radio equipment;

(2) navigation equipment;

(3) obtaining the departure clearance;

(4) setting up radio navaids before take-off for example VOR frequencies, required radials, etc.;

(5) aerodrome departure procedures, frequency changes;

(6) altitude and position reporting as required;

(7) SID procedures;

(8) obstacle clearance considerations.

Air exercise:

(1) radio equipment serviceability checks;

(2) departure clearance;

(3) navaid selection;

(4) frequencies, radials, etc.;

(5) aerodrome departure checks, frequency changes, altitude and position reports;

(6) SID procedures.

Exercise 10: Instrument approach: precision approach aid to specified minima and missed approach procedures

Long briefing objectives:

(1) precision approach charts;

(2) approach to the initial approach fix and minimum sector altitude;

(3) navaid requirements, for example radar, ADF, etc.;

(4) communication (ATC liaison and R/T phraseology);

(5) holding procedure;

(6) the final approach track;

(7) forming a mental picture of the approach;

(8) completion of aerodrome approach checks;

(9) initial approach procedure;

(10) selection of the ILS frequency and identification;

(11) obstacle clearance altitude or height;

(12) operating minima;

(13) achieving the horizontal and vertical patterns;

(14) assessment of distance, groundspeed time, and rate of descent from the final approach fix to the aerodrome;

(15) use of DME (as applicable);

(16) go-around and missed approach procedure;

(17) review of the published instructions;

(18) transition from instrument to visual flight (sensory illusions);

(19) visual manoeuvring after an instrument approach;

(i) circling approach;

(ii) visual approach to landing.

Air exercise:

(1) initial approach to the ILS;

(2) completion of approach planning;

(3) holding procedure;

(4) frequency selection and identification of ILS;

(5) review of the published procedure and minimum sector altitude;

(6) communication (ATC liaison and R/T phraseology);

(7) determination of operating minima and altimeter setting;

(8) weather consideration, for example cloud base and visibility;

(9) availability of landing site lighting;

(10) ILS entry methods;

(11) radar vectors;

(12) procedural method;

(13) assessment of approach time from the final approach fix to the aerodrome;

(14) determination of:

(i) the descent rate on final approach;

(ii) the wind velocity at the surface and the length of the landing site;

(iii) the obstruction heights to be borne in mind during visual manoeuvring after an instrument approach;

(15) circling approach;

(16) the approach:

(i) at the final approach fix;

(ii) use of DME (as applicable);

(iii) ATC liaison;

(iv) note time and establish air speed and descent rate;

(v) maintaining the localizer and glide path;

(vi) anticipation in change of wind velocity and its effect on drift;

(vii) decision height.

(17) landing direction;

(18) go-around and missed approach procedure;

(19) transition from instrument to visual flight;

(20) circling approach;

(21) visual approach to landing.

Exercise 11: Instrument approach: non-precision approach to specified minima and missed approach procedures

Long briefing objectives:

(1) non-precision approach charts;

(2) initial approach to the initial approach fix and minimum sector altitude;

(3) ATC liaison;

(4) communication (ATC procedures and R/T phraseology);

(5) approach planning;

(6) holding procedure;

(7) the approach track;

(8) forming a mental picture of the approach;

(9) initial approach procedure;

(10) operating minima;

(11) completion of approach planning;

(12) achieving the horizontal and vertical patterns;

(13) assessment of distance, groundspeed time, and rate of descent from the final approach fix to the aerodrome;

(14) use of DME (as applicable);

(15) go-around and missed approach procedure;

(16) review of the published instructions;

(17) transition from instrument to visual flight (sensory illusions);

(18) visual manoeuvring after an instrument approach;

(19) circling approach;

(20) visual approach to landing.

Air exercise:

(1) completion of approach planning, including determination of:

(i) descent rate from the final approach fix;

(ii) the wind velocity at the surface and length of the landing site;

(iii) the obstruction heights to be borne in mind during visual manoeuvring after an instrument approach.

(2) circling approach;

(3) go-around and missed approach procedure;

(4) initial approach;

(5) frequency selection and identification;

(6) review of the published procedure and minimum safe sector altitude;

(7) ATC liaison and R/T phraseology;

(8) determination of decision height and altimeter setting;

(9) weather considerations, for example cloud base and visibility;

(10) availability of landing site lighting;

(11) determination of inbound track;

(12) assessment of time from final approach fix to the missed approach point;

(13) ATC liaison;

(14) the outbound procedure (incl. completion of pre-landing checks);

(15) the inbound procedure;

(16) re-check of identification code;

(17) altimeter setting re-checked;

(18) the final approach;

(19) note time and establish air speed and descent rate;

(20) maintaining the final approach track;

(21) anticipation of change in wind velocity and its effect on the drift;

(22) minimum descent altitude or height;

(23) landing site direction;

(24) go-around and missed approach procedure;

(25) transition from instrument to visual flight (sensory illusions);

(26) visual approach.

Exercise 12: Use of GNSS (to be developed)

(a) Long briefing objectives: use of GNSS.

(b) Air exercise: use of GNSS.

C. Airships

Long briefings and air exercises

Exercise 1: Instrument flying (basic)

(for revision as deemed necessary by the instructor)

Long briefing objectives:

(1) flight instruments;

(2) physiological considerations;

(3) instrument appreciation:

(i) attitude instrument flight;

(ii) pitch indications;

(iii) different instrument presentations;

(iv) introduction to the use of the attitude indicator;

(v) pitch attitude;

(vi) maintenance of heading and balanced flight;

(vii) instrument limitations (inclusive system failures).

(4) attitude, power and performance:

(i) attitude instrument flight;

(ii) control instruments;

(iii) performance instruments;

(iv) effect of changing power, trim and configuration;

(v) cross-checking the instrument indications;

(vi) instrument interpretation;

(vii) direct and indirect indications (performance instruments);

(viii) instrument lag;

(ix) selective radial scan.

(5) the basic flight manoeuvres (full panel):

(i) straight and level flight at various air speeds and airship configurations;

(ii) climbing;

(iii) descending;

(iv) standard rate turns;

(v) level, climbing and descending on to pre-selected headings.

Air exercise:

(1) physiological sensations;

(2) instrument appreciation;

(3) attitude instrument flight;

(4) pitch attitude;

(5) bank attitude;

(6) maintenance of heading and balanced flight;

(7) attitude instrument flight;

(8) effect of changing power and configuration;

(9) cross-checking the instruments;

(10) selective radial scan;

(11) the basic flight manoeuvres (full panel):

(i) straight and level flight at various air speeds and airship configurations;

(ii) climbing;

(iii) descending;

(iv) standard rate turns;

(v) level, climbing and descending on to pre-selected headings.

Exercise 2: Instrument flying (advanced)

Long briefing objectives:

(1) full panel;

(2) unusual attitudes: recoveries;

(3) transference to instruments after take-off;

(4) limited panel;

(5) basic flight manoeuvres;

(6) unusual attitudes: recoveries.

Air exercise:

(1) full panel;

(2) unusual attitudes: recoveries;

(3) limited panel;

(4) repeat of the above exercises.

Exercise 3: Radio navigation (applied procedures): use of VOR

Long briefing objectives:

(1) availability of VOR stations en-route;
(2) station frequencies and identification;
(3) signal reception range;
(4) effect of altitude;
(5) VOR radials;
(6) use of OBS;
(7) to or from indicator;
(8) orientation;
(9) selecting radials;
(10) intercepting a pre-selected radial;
(11) assessment of distance to interception;
(12) effects of wind;
(13) maintaining a radial;
(14) tracking to and from a VOR station;
(15) procedure turns;
(16) station passage;
(17) use of two stations for obtaining a fix;
(18) pre-selecting fixes along a track;
(19) assessment of ground speed and timing;
(20) holding procedures;
(21) various entries;
(22) communication (R/T procedures and ATC liaison).

Air exercise:

(1) station selection and identification;
(2) orientation;
(3) intercepting a pre-selected radial;
(4) R/T procedures and ATC liaison;
(5) maintaining a radial inbound;
(6) recognition of station passage;
(7) maintaining a radial outbound;
(8) procedure turns;
(9) use of two stations to obtain a fix along the track;
(10) assessment of ground speed and timing;

(11) holding procedures and entries;

(12) holding at a pre-selected fix;

(13) holding at a VOR station.

Exercise 4: Radio navigation (applied procedures): use of ADF

(Automatic DF equipment)

Long briefing objectives:

(1) availability of NDB facilities en-route;

(2) location, frequencies, tuning (as applicable) and identification codes;

(3) signal reception range;

(4) static interference;

(5) night effect;

(6) station interference;

(7) mountain effect;

(8) coastal refraction;

(9) orientation in relation to an NDB;

(10) homing;

(11) intercepting a pre-selected magnetic bearing and tracking inbound;

(12) station passage;

(13) tracking outbound;

(14) time and distance checks;

(15) use of two NDBs to obtain a fix or alternatively use of one NDB and one other navaid;

(16) holding procedures and various approved entries;

(17) communication (R/T procedures and ATC liaison).

Air exercise:

(1) selecting, tuning and identifying an NDB;

(2) ADF orientation;

(3) communication (R/T procedures and ATC liaison);

(4) homing;

(5) tracking inbound;

(6) station passage;

(7) tracking outbound;

(8) time and distance checks;

(9) intercepting a pre-selected magnetic bearing;

(10) determining the airship’s position from two NDBs or alternatively from one NDB and one other navaid;

(11) ADF holding procedures and various approved entries.

Exercise 5: Radio navigation (applied procedures): use of VHF/DF

Long briefing objectives:

(1) availability of VHF/DF facilities en-route;

(2) location, frequencies, station call signs and hours of operation;

(3) signal and reception range;

(4) effect of altitude;

(5) communication (R/T procedures and ATC liaison);

(6) obtaining and using types of bearings, for example QTE, QDM, QDR;

(7) homing to a station;

(8) effect of wind;

(9) use of two VHF/DF stations to obtain a fix (or alternatively one VHF/DF station and one other navaid);

(10) assessment of groundspeed and timing.

Air exercise:

(1) establishing contact with a VHF/DF station;

(2) R/T procedures and ATC liaison;

(3) obtaining and using a QDR and QTE;

(4) homing to a station;

(5) effect of wind;

(6) use of two VHF/DF stations to obtain a fix (or alternatively one VHF/DF station and one other navaid);

(7) assessment of groundspeed and timing.

Exercise 6: Radio navigation (applied procedures): use of DME

Long briefing objectives:

(1) availability of DME facilities;

(2) location, frequencies and identification codes;

(3) signal reception range;

(4) slant range;

(5) use of DME to obtain distance, groundspeed and timing;

(6) use of DME to obtain a fix.

Air exercise:

(1) station selection and identification;

(2) use of equipment functions;

(3) distance;

(4) groundspeed;

(5) timing;

(6) DME arc approach;

(7) DME holding.

Exercise 7: Radio navigation (applied procedures): use of transponders

Long briefing objectives:

(1) operation of transponders;

(2) code selection procedure;

(3) emergency codes;

(4) precautions when using airborne equipment.

Air exercise:

(1) operation of transponders;

(2) types of transponders;

(3) code selection procedure;

(4) emergency codes;

(5) precautions when selecting the required code.

Exercise 8: Radio navigation (applied procedures): use of en-route radar services

Long briefing objectives:

(1) availability of radar services;

(2) location, station frequencies, call signs and hours of operation;

(3) AIP and NOTAMS;

(4) provision of service;

(5) communication (R/T, procedures and ATC liaison);

(6) airspace radar advisory service;

(7) emergency service;

(8) aircraft separation standards.

Air exercise:

(1) communication (R/T procedures and ATC liaison);

(2) establishing the service required and position reporting;

(3) method of reporting conflicting traffic;

(4) terrain clearance.

Exercise 9: Pre-flight and aerodrome departure and arrival procedures

Long briefing objectives:

(1) determining the serviceability of the airship radio;

(2) navigation equipment;

(3) obtaining the departure clearance;

(4) setting up radio navaids before take-off for example VOR frequencies, required radials, etc.;

(5) aerodrome departure procedures, frequency changes;

(6) altitude and position reporting as required;

(7) SID procedures;

(8) obstacle clearance considerations.

Air exercise:

(1) radio equipment serviceability checks;

(2) departure clearance;

(3) navaid selection;

(4) frequencies, radials, etc.;

(5) aerodrome departure checks, frequency changes, altitude and position reports;

(6) SID procedures.

Exercise 10: Instrument approaches: ILS approaches to specified minima and missed approaches procedures

Long briefing objectives:

(1) precision approach charts;

(2) approach to the initial approach fix and minimum sector altitude;

(3) navaid requirements, for example radar, ADF, etc.;

(4) communication (ATC liaison and R/T phraseology);

(5) review;

(6) holding procedure;

(7) the final approach track;

(8) forming a mental picture of the approach;

(9) completion of aerodrome approach checks;

(10) initial approach procedure;

(11) selection of the ILS frequency and identification;

(12) obstacle clearance altitude or height;

(13) operating minima;

(14) achieving the horizontal and vertical patterns;

(15) assessment of distance, groundspeed time, and rate of descent from the final approach fix to the aerodrome;

(16) use of DME (as applicable);

(17) go-around and missed approach procedure;

(18) review of the published instructions;

(19) transition from instrument to visual flight (sensory illusions);

(20) visual manoeuvring after an instrument approach;

(i) circling approach;

(ii) visual approach to landing.

Air exercise:

(1) initial approach to the ILS;

(2) completion of approach planning;

(3) holding procedure;

(4) frequency selection and identification of ILS;

(5) review of the published procedure and minimum sector altitude;

(6) communication (ATC liaison and R/T phraseology);

(7) determination of operating minima and altimeter setting;

(8) weather consideration, for example cloud base and visibility;

(9) availability of runway lighting;

(10) ILS entry methods;

(11) radar vectors;

(12) procedural method;

(13) assessment of approach time from the final approach fix to the aerodrome;

(14) determination of:

(i) the descent rate on final approach;

(ii) the wind velocity at the surface (and the length of the landing runway);

(iii) the obstruction heights to be borne in mind during visual manoeuvring after an instrument approach;

(15) circling approach;

(16) the approach:

(i) at the final approach fix;

(ii) use of DME (as applicable);

(iii) ATC liaison;

(iv) note time and establish air speed and descent rate;

(v) maintaining the localiser and glide path;

(vi) anticipation in change of wind velocity and its effect on drift ;

(vii) decision height;

(viii) runway direction.

(17) missed approach procedure;

(18) transition from instrument to visual flight;

(19) circling approach;

(20) visual approach to landing.

Exercise 11: Instrument approaches: NDB approaches to specified minima and missed approaches procedure

Long briefing objectives:

(1) non-precision approach charts;

(2) initial approach to the initial approach fix and minimum sector altitude;
(3) ATC liaison;
(4) communication (ATC procedures and R/T phraseology);
(5) approach planning:
  (i) holding procedure;
  (ii) the approach track;
  (iii) forming a mental picture of the approach;
  (iv) initial approach procedure;
  (v) operating minima;
  (vi) completion of approach planning.
(6) achieving the horizontal and vertical patterns;
(7) assessment of distance, groundspeed time, and rate of descent from the final approach fix to the aerodrome;
(8) use of DME (as applicable);
(9) go-around and missed approach procedure;
(10) review of the published instructions;
(11) transition from instrument to visual flight (sensory illusions);
(12) visual manoeuvring after an instrument approach;
(13) circling approach;
(14) visual approach to landing.

Air exercise:

(1) completion of approach planning including
(2) determination of:
  (i) descent rate from the final approach fix;
  (ii) the wind velocity at the surface and length of the landing runway;
  (iii) the obstruction heights to be borne in mind during visual manoeuvring after an instrument approach.
(3) circling approach;
(4) go-around and missed approach procedure;
(5) initial approach;
(6) frequency selection and identification;
(7) review of the published procedure and minimum safe sector altitude;
(8) ATC liaison and R/T phraseology;
(9) determination of decision height and altimeter setting;
(10) weather considerations, for example cloud base and visibility;
(11) availability of runway lighting;
(12) determination of inbound track;
(13) assessment of time from final approach fix to the missed approach point;
(14) ATC liaison;
(15) the outbound procedure (inclusive completion of pre-landing checks);
(16) the inbound procedure;

(17) re-check of identification code;
(18) altimeter setting re-checked;
(19) the final approach;
(20) note time and descent rate;
(21) maintaining the final approach track;
(22) anticipation of change in wind velocity and its effect on the drift;
(23) minimum descent altitude or height;
(24) runway direction;
(25) go-around and missed approach procedure;
(26) transition from instrument to visual flight (sensory illusions);
(27) visual approach.

Exercise 12: Radio navigation (applied procedures): use of GNNS (to be developed)

(a) Long briefing objectives: use of GNSS.
(b) Air exercise: use of GNSS.

AMC1 FCL.930.MCCI MCCI Training course

Aeroplanes

General

The objective of the technical training is to apply the core instructor competencies acquired during the teaching and learning training to MCC training.

During the practical training the applicant should demonstrate the ability to instruct a pilot in MCC.

To supervise applicants for MCCI certificates, the adequate experience should include at least three type rating or MCC courses.

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.

The student instructor should learn how to identify common errors and how to correct them properly, which should be emphasised at all times.

Course objective

The course should be designed to give adequate training to the applicant in theoretical knowledge instruction and FSTD instruction to instruct those aspects of MCC required by an applicant for a type rating on a first MP aeroplane.

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 FFS under the supervision of a TRI(A), SFI(A) or MCCI(A) nominated by the ATO for this purpose.

The course consists of three parts:

(1) Part 1: teaching and learning that should follow the content of AMC1 FCL.920;
(2) Part 2: technical theoretical knowledge instruction (technical training);
(3) Part 3: flight instruction.

Part 1

The content of the teaching and learning part of the FI training course, as established in AMC1 FCL.930.FI, should be used as guidance to develop the course syllabus.

Part 2

Technical theoretical knowledge instruction syllabus

The FSTD training consists of the application of core instructor competencies to MCC training in a commercial air transport environment, including principles of threat and error management and CRM.

The content of the training programme should cover MCC course exercises in sufficient depth to meet the standard required for issue of the MCCI(A) certificate.

The course should be related to the type of FSTD on which the applicant wishes to instruct. A training programme should give details of all theoretical knowledge instruction.

Identification and application of human factors (as set in the ATPL syllabus 040) related to MCC aspects of the training.

Part 3

Flight instruction syllabus

(a) The content of the instruction programme should cover training exercises as applicable to the MCC requirements of an applicant for a MP type rating.

(b) 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:

(1) pre-flight preparation, including documentation, and computation of take-off performance data;

(2) pre-flight checks, including radio and navigation equipment checks and setting;

(3) before take-off checks, including powerplant checks, and take-off briefing by the PF;

(4) normal take-offs with different flap settings, tasks of PF and PNF, call -outs;

(5) rejected take-offs; crosswind take-offs; take-offs at maximum take-off mass; engine failure after v1;

(6) normal and abnormal operation of aircraft systems, use of checklists;

(7) 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;

(8) early recognition of and reaction on approaching stall in differing aircraft configurations;

(9) 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 the PF, setting of navigation equipment, call-out procedures during approaches; computation of approach and landing data;

(10) go-arounds; normal and with one engine simulated inoperative, transition from instrument to visual flight on reaching decision height or minimum descent height or altitude;

(11) landings, normal, crosswind and with one engine simulated inoperative, transition from instrument to visual flight on reaching decision height or minimum descent height or altitude.

Subpart K - Examiners

GM1 FCL.1000 Examiner certificates

Special conditions

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

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

The certificate should ideally be limited in validity to the time needed to qualify the first examiners for the new aircraft in accordance with this Subpart, but in any case it should not exceed the 3 years established in the rule.

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

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

AMC1 FCL.1010 Prerequisites for examiners

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

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

AMC1 FCL.1015 Examiner standardisation

General

The Kuwait DGCA may provide the course itself or through an arrangement with an ATO. This arrangement should clearly state that the ATO is acting under the management system of the Kuwait DGCA.

The course should last:

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

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

The Kuwait DGCA or the ATO should determine any further training required before presenting the candidate for the examiner assessment of competence.

Content

The training should comprise:

(1) Theoretical training covering at least:

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

(ii) Part-FCL and related AMCs and GM relevant to their duties;

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

(iv) national requirements relevant to their examination duties;

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

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

(vii) management system of ATOs;

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

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

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

(4) Practical training consisting of at least:

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

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

(5) For an initial examiner certificate, practical training should include the examination of the test profile sought, consisting of the conduct of at least two test or check profiles in the role of examiner (these two tests or checks profiles can be performed in the same simulator session), including briefing, conduct of the skill test and proficiency check, assessment of the applicant to whom the test or check is given, debriefing and recording or documentation under the supervision of an examiner of the appropriate category on the applicable type.

This training is conducted in the aircraft if approval for testing or checking in the aircraft is required. If examiner privileges in FSTD's are required, practical instruction in the use of FSTD(s) for testing or checking should also be completed.

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

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

new type may be required, which may be supervised by an inspector of the Kuwait DGCA or a suitably authorised senior examiner.

AMC2 FCL.1015 Examiner standardisation

Standardisation arrangements for examiners limitations

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

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

Purpose of a test or check

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

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

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

Conduct of test or check

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

Each item within a test or check section should be completed and assessed separately. The test or check schedule, as briefed, should not normally be altered by an examiner. A failed item is not always a failed section, for example type rating skill test where a failure of an item in a section does not fail the entire section, only the failed item is taken again.

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

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

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

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

Examiner preparation

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

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

Examiner approach

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

Assessment system

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

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

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

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

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

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

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

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

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

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

Method and contents of the test or check

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

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

A test or check flight will be conducted within the limitations contained in the operations manual of an ATO.

Contents:

(1) a test or check is comprised of:

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

(ii) pre-flight briefing;

(iii) in-flight exercises;

(iv) post-flight debriefing.

(2) oral examination on the ground should include:

(i) aircraft general knowledge and performance;

(ii) planning and operational procedures;

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

(3) pre-flight briefing should include:

(i) test or check sequence;

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

(iii) safety considerations.

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

(5) post-flight debriefing should include:

(i) assessment or evaluation of the applicant;

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

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

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

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

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

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

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

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

GM1 FCL.1015 Examiner standardisation

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

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

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

(3) two tests or checks related to CPL, IR or ATPL;

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

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

(b) An examiner should plan at least 2 hours for a LAPL, SPL or BPL, 3 hours for a PPL, CPL, IR or class rating test or checks, and at least 4 hours for FI, CPL, IR, MPL, ATPL or MP type rating tests or checks, including pre-flight briefing and

preparation, conduct of the test, check or assessment of competence, de-briefing, evaluation of the applicant and documentation.

(c) When planning the duration of a test, check or assessment of competence, the following values may be used as guidance:

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

(2) 90 minutes for LAPL(A) or (H), PPL and CPL, including navigation section;

(3) 60 minutes for IR, FI and SP type or class ratings;

(4) 120 minutes for CPL, MPL, ATPL and MP type ratings.

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

GM1 FCL.1015(a); FCL.1025(b)(2)

EXAMINER STANDARDISATION COURSES AT AN ATO OR A DTO

In point FCL.1015(a) (second sentence) and in point FCL.1025(b)(2) (second sentence), the word 'may' is used to indicate that completing an examiner standardisation course or an examiner refresher course at a DTO is an option which can be used by examiners for sailplanes and balloons as an alternative to completing such courses provided by the competent authority or an ATO (first sentence in both point FCL.1015(a) and point FCL.1025(b)(2)).

AMC1 FCL.1020 Examiners assessment of competence

GENERAL

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

DEFINITIONS

(b) Definitions:

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

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

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

CONDUCT OF THE ASSESSMENT

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

BRIEFING THE 'CANDIDATE'

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

(1) the objective of the flight;

(2) licensing checks, as necessary;

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

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

(5) weather assessment;

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

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

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

(9) use of screens (if applicable);

(10) contents of exercise to be performed;

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

(12) use of R/T;

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

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

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

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

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

(3) responsibility for safe conduct of the flight;

(4) intervention by examiner, when necessary;

(5) use of screens;

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

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

(8) keeping brief, factual and unobtrusive notes.

Assessment

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

(1) questions from the 'candidate';

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

(3) give reasons for failure.

Debriefing

(g) The examiner applicant should demonstrate to the inspector the ability to conduct a fair, unbiased debriefing of the 'candidate' based on identifiable factual items. A

balance between friendliness and firmness should be evident. The following points should be discussed with the 'candidate', at the applicant's discretion:

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

(2) mention any other points of criticism noted;

(3) give any advice considered helpful.

Recording or documentation

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

(1) the relevant test or check form;

(2) licence entry;

(3) notification of failure form;

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

Demonstration of theoretical knowledge

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

AMC1 FCL.1020; FCL.1025

Qualification of senior examiners

A senior examiner specifically tasked by the Kuwait DGCA to observe skill tests or proficiency checks for the revalidation of examiner certificates should:

(1) hold a valid or current examiner certificate appropriate to the privileges being given;

(2) have examiner experience level acceptable to the Kuwait DGCA;

(3) have conducted a number of skill tests or proficiency checks as a Part-FCL examiner.

The Kuwait DGCA may conduct a pre-assessment of the applicant or candidate carrying out a skill test and proficiency check under supervision of an inspector of the Kuwait DGCA.

Applicants should be required to attend a senior examiner briefing, course or seminar arranged by the Kuwait DGCA. Content and duration will be determined by the Kuwait DGCA and should include:

(1) pre-course self-study;

(2) legislation;

(3) the role of the senior examiner;

(4) an examiner assessment;

(5) national administrative requirements.

The validity of the authorisation should not exceed the validity of the examiners certificate, and in any case should not exceed 3 years. The authorisation may be revalidated in accordance with procedures established by the Kuwait DGCA.

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

Examiner refresher seminar

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

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

Obligations for examiners application and report forms

Common application and report forms can be found:

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

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

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

Appendices

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

General

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

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

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

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

A. ATP integrated course: aeroplanes

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

Crediting

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

Theoretical knowledge

The 750 hours of instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions.

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

(1)	Air law	40 hours
(2)	Aircraft general knowledge	80 hours
(3)	Flight performance and planning	90 hours
(4)	Human performance and limitations	50 hours
(5)	Meteorology	60 hours
(6)	Navigation	150 hours
(7)	Operational procedures	20 hours
(8)	Principles of flight	30 hours
(9)	Communications	30 hours

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

Flying training

The flying instruction is divided into five phases:

(1) phase 1:

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

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

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

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

(iv) normal take-offs and landings;

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

(vi) unusual attitudes and simulated engine failure.

(2) phase 2:

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

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

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

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

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

(v) crosswind take-offs and landings;

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

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

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

(3) phase 3:

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

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

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

(ii) VFR flight at relatively critical high air speeds, recognition of and recovery from spiral dives;

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

(iv) night flight time including take-offs and landings as PIC.

(4) phase 4:

Exercises up to the instrument rating skill test comprise:

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

(ii) 20 hours instrument time flown as SPIC;

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

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

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

(B) SIDs and arrivals;

(C) en-route IFR procedures;

(D) holding procedures;

(E) instrument approaches to specified minima;

(F) missed approach procedures;

(G) landings from instrument approaches, including circling.

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

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

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

(6) phase 6:

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

(ii) if a type rating for MP aeroplanes is not required on completion of this part, the applicant will be provided with a certificate of course completion for MCC training.

B. ATP modular theoretical knowledge course: aeroplanes

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

(b) An approved course should include formal classroom work and may include the use of such facilities as interactive video, slide or tape presentation, learning carrels and computer-based training and other media distance learning (correspondence) courses as approved by the Kuwait DGCA. Approved distance learning (correspondence) courses may also be offered as part of the course.

(c) The ATP modular course should be completed 18 months. This period may be extended where additional training is provided by the ATO. The flight instruction

and skill test need to be completed within the period of validity of the pass in the theoretical examinations.

C. CPL/IR integrated course: aeroplanes

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

Crediting

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

Theoretical knowledge

The 500 hours of instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions.

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

(1)	Air law	30 hours
(2)	Aircraft general knowledge	50 hours
(3)	Flight performance and planning	60 hours
(4)	Human performance and limitations	15 hours
(5)	Meteorology	40 hours
(6)	Navigation	100 hours
(7)	Operational procedures	10 hours
(8)	Principles of flight	25 hours
(9)	Communications	30 hours

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

Flying training

The flying instruction is divided into four phases:

(1) phase 1:

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

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

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

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

(iv) normal take-offs and landings;

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

(vi) unusual attitudes and simulated engine failure.

(2) phase 2:

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

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

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

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

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

(v) crosswind take-offs and landings;

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

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

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

(3) phase 3:

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

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

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

(ii) VFR flight at relatively critical high air speeds, recognition of and recovery from spiral dives;

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

(iv) night flight time including take-offs and landings as PIC.

(4) phase 4:

Exercises up to the instrument rating skill test comprise:

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

(ii) 20 hours instrument time flown as SPIC;

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

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

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

(B) SIDs and arrivals;

(C) en-route IFR procedures;

(D) holding procedures;

(E) instrument approaches to specified minima;

(F) missed approach procedures;

(G) landings from instrument approaches, including circling.

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

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

D. CPL integrated course: aeroplanes

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

Crediting

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

Theoretical knowledge

(c) The 350 hours of instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions.

Flying training

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

(1) phase 1:

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

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

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

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

(iv) normal take-offs and landings;

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

(vi) unusual attitudes and simulated engine failure.

(2) phase 2:

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

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

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

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

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

(v) crosswind take-offs and landings;

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

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

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

(3) phase 3:

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

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

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

(iii) VFR flight at relatively critical high air speeds, recognition of and recovery from spiral dives;

(iv) night flight time including take-offs and landings as PIC.

(4) phase 4:

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

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

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

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

(iv) ME training.

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

E. CPL modular course: aeroplanes

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

An approved course should include formal classroom work and may include the use of such facilities as interactive video, slide or tape presentation, learning carrels and computer-based training and other media distance learning (correspondence) courses as approved by the Kuwait DGCA. Approved distance learning (correspondence) courses may also be offered as part of the course.

Theoretical knowledge

The 250 hours of instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions.

Flying training

The following flight time is suggested for the flying training:

(1) visual flight training: suggested flight time

(i) Exercise 1:

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

(ii) Exercise 2: 0:45 hours

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

(iii) Exercise 3: 0:45 hours

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

(iv) Exercise 4: 1:00 hours

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

(v) Exercise 5: 1:00 hours

crosswind take-offs, landings and go-arounds.

(vi) Exercise 6: 0:45 hours

flight at relatively critical high air speeds; recognition of and recovery from spiral dives.

(vii) Exercise 7: 0:45 hours

flight at critically slow air speeds, spin avoidance, recognition of and recovery from incipient and full stalls.

(viii) Exercise 8: 10:00 hours

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

(2) instrument flight training:

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

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

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

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

(A) the training is complemented by exercises on an aeroplane;

(B) the record of the parameters of the flight is available;

(C) an FI(A) or IRI(A) conducts the instruction.

(v) Exercise 9: 0:30 hours

Basic instrument flying without external visual cues; horizontal flight; power changes for acceleration or deceleration, maintaining straight and level flight; turns in level flight with 15° and 25° bank, left and right; roll-out onto predetermined headings.

(vi) Exercise 10: 0:45 hours

Repetition of exercise 9; additionally climbing and descending, maintaining heading and speed, transition to horizontal flight; climbing and descending turns.

(vii) Exercise 11: 0:45 hours

Instrument pattern:

(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;

(H) climb at best rate of climb speed.

(viii) Exercise 12: 0:45 hours

Repetition of exercise 9 and steep turns with 45° bank; recovery from unusual attitudes.

(ix) Exercise 13: 0:45 hours

Repetition of exercise 12

(x) Exercise 14: 0:45 hours

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

(xi) Exercise 15: 0:45 hours

Repetition of exercise 9 and recovery from unusual attitudes.

(xii) Exercise 16: 0:45 hours

Repetition of exercise 9, turns and level change and recovery from unusual attitudes with simulated failure of the artificial horizon or directional gyro.

(xiii) Exercise 17: 0:45 hours

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

Exercise 18: 3:30 hours

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

(3) ME training

If required, operation of an ME aeroplane in the exercises 1 through 18, including operation of the aeroplane with one engine simulated inoperative, and engine shutdown and restart. Before commencing training, the applicant should have complied with the type and class ratings requirements as appropriate to the aeroplane used for the test.

F. ATP/IR integrated course: helicopters

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

Crediting

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

Theoretical knowledge

The 750 hours of instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions.

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

(1)	Air law	40 hours
(2)	Aircraft general knowledge	80 hours
(3)	Flight performance and planning	90 hours
(4)	Human performance and limitations	50 hours
(5)	Meteorology	60 hours
(6)	Navigation	150 hours
(7)	Operational procedures	20 hours
(8)	Principles of flight	30 hours
(9)	Communications	30 hours

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

The flight instruction is divided into four phases:

(1) phase 1:

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

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

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

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

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

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

(2) phase 2:

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

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

(ii) incipient vortex ring recovery;

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

(iv) steep turns;

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

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

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

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

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

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

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

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

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

(3) phase 3:

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

The instruction and testing should contain the following:

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

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

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

(B) SIDs and arrivals;

(C) en-route IFR procedures;

(D) holding procedures;

(E) instrument approaches to specified minima;

(F) missed approach procedure;

(G) landings from instrument approaches;

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

(I) instrument exercises with one engine simulated inoperative.

(4) phase 4:

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

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

G. ATP integrated course: helicopters

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

Crediting

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

Theoretical knowledge

The 650 hours of instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions.

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

(1)	Air law	30 hours
(2)	Aircraft general knowledge	70 hours
(3)	Flight performance and planning	65 hours
(4)	Human performance and limitations	40 hours
(5)	Meteorology	40 hours
(6)	Navigation	120 hours
(7)	Operational procedures	20 hours
(8)	Principles of flight	30 hours
(9)	Communications	25 hours

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

The flight instruction is divided into three phases:

(1) phase 1:

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

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

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

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

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

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

(2) phase 2:

Flight exercises until general handling and day VFR navigation progress and basic instrument flying progress check conducted by an FI not connected with the applicant's training. This phase comprises a total flight time of not less than 128 hours, including 73 hours of dual instruction flight time and including at least 5

hours VFR conversion training on an ME helicopter, 15 hours of solo flight and 40 hours flown as student PIC. The instruction and testing contain the following:

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

(ii) incipient vortex ring recovery;

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

(iv) steep turns;

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

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

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

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

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

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

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

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

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

(3) phase 3:

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

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

H. ATP modular theoretical knowledge course: helicopters

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

(b) An approved course should include formal classroom work and may include the use of such facilities as interactive video, slide or tape presentation, learning carrels and computer-based training and other media distance learning (correspondence) courses as approved by the Kuwait DGCA. Approved distance learning (correspondence) courses may also be offered as part of the course.

(c) The ATP modular course should last 18 months. This period may be extended where additional training is provided by the ATO. The flight instruction and skill test

need to be completed within the period of validity of the pass in the theoretical examinations.

I. CPL/IR integrated course: helicopters

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

Crediting

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

Theoretical knowledge

The 500 hours of instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions.

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

(1)	Air law	30 hours
(2)	Aircraft general knowledge	50 hours
(3)	Flight performance and planning	60 hours
(4)	Human performance and limitations	15 hours
(5)	Meteorology	40 hours
(6)	Navigation	100 hours
(7)	Operational procedures	10 hours
(8)	Principles of flight	25 hours
(9)	Communications	30 hours

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

Flying training

The flight instruction is divided into three phases:

(1) phase 1:

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

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

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

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

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

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

(2) phase 2:

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

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

(ii) incipient vortex ring recovery;

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

(iv) steep turns;

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

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

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

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

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

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

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

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

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

(3) phase 3:

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

The instruction and testing should contain the following:

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

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

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

(B) SIDs and arrivals;

(C) en-route IFR procedures;

(D) holding procedures;

(E) instrument approaches to specified minima;

(F) missed approach procedure;

(G) landings from instrument approaches;

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

(I) instrument exercises with one engine simulated inoperative.

J. CPL integrated course: helicopters

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

Crediting

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

Theoretical knowledge

The 350 hours of instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions.

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

(1)	Air law	25 hours
(2)	Aircraft general knowledge	30 hours
(3)	Flight performance and planning	25 hours
(4)	Human performance and limitations	10 hours
(5)	Meteorology	30 hours
(6)	Navigation	55 hours
(7)	Operational procedures	8 hours
(8)	Principles of flight	20 hours
(9)	Communications	10 hours

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

Flying training

The flight instruction is divided into two phases:

(1) phase 1:

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

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

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

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

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

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

(2) phase 2:

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

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

(ii) incipient vortex ring recovery;

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

(iv) steep turns;

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

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

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

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

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

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

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

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

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

K. CPL modular course: helicopters

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

An approved course should include formal classroom work and may include the use of facilities such as interactive video, slide or tape presentation, learning carrels and computer-based training and other media distance learning (correspondence) courses

as approved by the Kuwait DGCA. Approved distance learning (correspondence) courses may also be offered as part of the course.

Theoretical knowledge

The 250 hours of instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions.

Flying training

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

Visual instruction

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

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

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

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

(4) recovery from incipient vortex ring condition;

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

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

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

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

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

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

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

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

Basic instrument instruction

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

(1) Exercise 1:

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

(2) Exercise 2:

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

(3) Exercise 3:

repetition of exercise 1; and recovery from unusual attitudes;

(4) Exercise 4:

radio navigation;

(5) Exercise 5:

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

AMC2 to Appendix 3; AMC1 to Appendix 5

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

(a) BASIC UPRT ELEMENTS AND COMPONENTS

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

Table 1: Basic UPRT elements and components		**Pre-flight briefing**	**Flying training**
A. Aerodynamics			
1.	General aerodynamic characteristics	•	•
2.	Aeroplane certification and limitations	•	•
4.	Aerodynamics (high and low altitude)	•	
5.	Aeroplane performance (high and low altitude)	•	
6.	AoA and stall awareness	•	•
7.	Aeroplane stability	•	•
8.	Control surface fundamentals	•	•
9.	Use of trim	•	•
10.	Icing and contamination effects	•	•
11.	Propeller slipstream (as applicable)	•	•
B. Causes of and contributing factors to upsets			
1.	Environmental	•	
2.	Pilot-induced	•	
3.	Mechanical (aeroplane systems)	•	
C. Safety review of accidents and incidents relating to aeroplane upsets			
1.	Safety review of accidents and incidents relating to aeroplane upsets	•	
D. G-load awareness and management			
1.	Positive/negative/increasing/decreasing G-loads	•	•
2.	Lateral G awareness (sideslip)	•	•
3.	G-load management	•	•
E. Energy management			
1.	Kinetic energy vs potential energy vs chemical energy (power)	•	•
F. Flight path management			
1.	Relationship between pitch, power and performance	•	•
2.	Performance and effects of differing power plants	•	•
3.	Manual and automation inputs for guidance and control (if applicable)	•	•
4.	Class-specific characteristics of flight path management	•	•
5.	Management of go-arounds from various stages during the approach	•	•
6.	Automation management (if applicable)	•	•
7.	Proper use of rudder	•	•
G. Recognition			
1.	Class-specific examples of physiological, visual and instrument clues during developing and developed upset	•	•
2.	Pitch/power/roll/yaw	•	•
3.	Effective scanning (effective monitoring)	•	•
4.	Stall protection systems and cues	•	•
5.	Criteria for identifying stalls and upsets	•	•
H. System malfunction (including immediate handling and subsequent operational considerations, as applicable)			

1.	Flight control defects	•	•
2.	Engine failure (partial or full)	•	•
3.	Instrument failures	•	•
4.	Loss of reliable airspeed (training elements as per point (lb) of AMC2 ORA.ATO.125[1]).	•	•
5.	Automation failures	•	•
6.	Stall protection system failures, including icing alerting systems	•	•

(b) MANOEUVRE-BASED UPRT EXERCISES

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

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

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

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

Table 3: Core elements and components of TEM, pilot competencies and human factors		**Pre-flight briefing**	**Flying training**
A. TEM			
1.	TEM framework	•	•
2.	Recognition of threats and errors	•	•
3.	Management of threats and errors	•	•
4.	Countermeasures against threats and errors to prevent undesired aircraft states, including early intervention and, when necessary to prevent upsets, timely application of countermeasures to manage undesired aircraft states	•	•

B. Pilot Competencies, including CRM			
1.	All elements listed in Table 1 of GM2 FCL.735.A	•	•
C. Human factors			
1.	Instrument interpretation, active monitoring, checking	•	•
2.	Distraction, inattention, fixation, fatigue	•	•
3.	Human information processing, cognitive effects	•	•
4.	Perceptual illusions (visual or physiological) and spatial disorientation, effects of G-loads	•	•
5.	Stress, startle and surprise effect	•	•
6.	Intuitive and counter-intuitive behaviour	•	•

GM1 to Appendix 3; Appendix 5

BASIC UPRT EXERCISES

(a) GENERAL

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

(b) UPRT WITH REFERENCE TO INSTRUMENTS

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

(c) INSTRUCTORS DELIVERING BASIC UPRT

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

(d) APPLICATION OF OEM RECOMMENDATIONS DURING DEVELOPING UPSETS

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

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

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

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

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

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

6.	**RECOVER** to level flight (Avoid the secondary stall due to premature recovery or excessive G-loading)
NOTE: (1) Recovery to level flight may require use of pitch trim. (2) WARNING: Excessive use of pitch trim or rudder may aggravate the upset situation or may result in high structural loads.	

ADDITIONAL GUIDANCE

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

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

Overview of FSTD training credits for dual instruction in helicopter flying training courses

		ATPL(H)/IR integrated			FSTD credits
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
Visual, including ME T/R training	75 hrs	15 hrs	40 hrs	130 hrs	30 hrs FFS C/D level or 25 hrs FTD 2, 3 or 20 hrs FNPT II/III
Basic instrument	10 hrs	-	-	10 hrs	20 hrs FFS or FTD 2, 3 or FNPT II/III or 10 hrs in at least an FNPT I
Instrument rating training	40 hrs	-		40 hrs	
MCC	15 hrs	-	-	15 hrs	15 hrs FFS or FTD 2, 3 (MCC) or FNPT II/III (MCC)
Total	140 hrs	55 hrs		195 hrs	65 hrs FFS or 60 hrs FTD 2, 3 or 55 hrs FNPT II/III or 10 hrs in at least an FNPT I
		ATPL(H)/VFR integrated			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
Visual including ME T/R training	75 hrs	15 hrs	40 hrs	130 hrs	30 hrs FFS C/D level or 25 hrs FTD 2, 3 or 20 hrs FNPT II/III
Basic instrument	10 hrs	-	-	10 hrs	5 hrs in at least an FNPT I
MCC / VFR	10 hrs	-	-	10 hrs	10 hrs FFS or FTD 2, 3 (MCC) or FNPT II/III (MCC)
Total	95 hrs	55 hrs		150 hrs	40 hrs FFS or 35 hrs FTD 2, 3 or 30 hrs FNPT II/III or

					5 hrs in at least an FNPT I
		CPL(H)/IR integrated			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
Visual including ME T/R training	75 hrs	15 hrs	40hrs	130 hrs	30 hrs FFS C/D level or 25 hrs FTD 2, 3 or 20 hrs FNPT II/III
Basic instrument	10 hrs	-	-	10 hrs	20 hrs FFS or FTD 2, 3 or FNPT II/III or 10 hrs in at least an FNPT I
Instrument rating training	40 hrs	-		40 hrs	
Total	125 hrs	55 hrs		180 hrs	50 hrs FFS C/D level or 45 hrs FTD 2, 3 or 40 hrs FNPT II/III or 10 hrs in at least an FNPT I
		CPL(H) Integrated			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
Visual	75 hrs	15 hrs	35 hrs	125 hrs	30 hrs FFS C/D level or 25 hrs FTD 2, 3 or 20 hrs FNPT II/III
Basic instrument	10 hrs	-	-	10 hrs	5 hrs in at least an FNPT I
Total	85 hrs	50 hrs		135 hrs	35 hrs FFS or 30 hrs FTD 2, 3 or 25 hrs FNPT II/III or 5 hrs in at least an FNPT I
		CPL(H) modular			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
Visual	20 hrs	-	-	20 hrs	5 hrs FFS or FTD 2, 3 or FNPT II/III
Basic instrument	10 hrs	-	-	10 hrs	5 hrs in at least an FNPT I
Total	30 hrs	-	-	30 hrs	10 hrs FFS or FTD 2,3 or FNPT II/III or 5 hrs in at least an FNPT I
		IR(H) modular			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT

SE	50 hrs	-	-	50 hrs	35 hrs FFS or FTD 2, 3 or FNPT II/III or 20 hrs FNPT I (H) or (A)
ME	55 hrs	-	-	55 hrs	40 hrs FFS; FTD 2, 3 FNPT II/III or 20 hrs FNPT I (H) or (A)
		MCC(H)			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
MCC / IR	20 hrs	-	-	20 hrs	20 hrs FFS or FTD 2, 3 (MCC) or FNPT II/III (MCC)
MCC / VFR	15 hrs	-	-	15 hrs	15 hrs FFS or FTD 2, 3 (MCC) or FNPT II/III (MCC)
MCC / IR for MCC/VFR holders	5 hrs	-	-	5 hrs	5 hrs FFS or FTD 2, 3 (MCC) or FNPT II/III (MCC)

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

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

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

GM1 to Appendix 5 Integrated MPL training course

General

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

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

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

MPL TRAINING SCHEME

The following scheme should be applied:

MPL Training Scheme

Minimum 240 hours of training, including "Pilot Flying" (PF) and "Pilot Non Flying"

Phases of training	Training Items	Flight and simulated flight training media – Minimum level requirement		Ground training media
Integrated TEM principles				
Phase 4 – advanced Type rating training within an airline oriented environment	• CRM • Landing training • All weather • LOFT • Abnormal procedures • Normal procedures	Aeroplane: ME Multi-crew certified	12 take-offs and landings as PF	
		FSTD FS level D or C + ATC simulation	PF / PNF	
Phase 3 – intermediate Application of multi-crew operations in a high performance ME turbine aeroplane	• CRM • LOFT • Abnormal procedures • Normal procedures • Multi-crew • Instrument flight	FSTD: *representing an ME turbine powered aeroplane to be operated with a co-pilot and qualified to an equivalent standard to level B + ATC simulation*	PF / PNF	• CBT • E-learning • Part task trainer • Class room
Phase 2 – basic Introduction of multi-crew operations and instrument flight	• CRM • PF/PNF complement • IFR cross-country • Instrument flight	Aeroplane: SE or ME FSTD: FNPT II + MCC	PF / PNF	
Phase 1 – core flying skills Specific basic SP training	• CRM • VFR Cross-country • Solo flight • Basic instrument flight • Principles of flight • Cockpit procedures • Upset recovery • Night flight	Aeroplane: SE or ME FSTD: FNPT I / BITD	PF	

Theoretical knowledge instruction

The 750 hours of theoretical knowledge instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions.

Competency units, competency elements and performance criteria

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

(1) cooperation

(2) leadership and managerial skills;

(3) situation awareness;

(4) decision making.

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

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

Perform Aircraft Ground and Pre-Flight Operations

List of competency elements and performance criteria:

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

Duty Observation and assessment Satisfactory (S) Unsatisfactory (U)

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

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

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

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

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

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

(vi) determines fuel requirement; PF/PNF

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

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

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

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

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

(i) ensures the airworthiness of the aircraft; PF

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

(iii)	performs FMS initialisation, data insertion and confirmation;	PF/PNF
(iv)	optimises and checks take-off performance and take-off data calculation.	PF/PNF
(5)	perform engine start:	(S) or (U)
(i)	asks for, receives acknowledges and checks ATC clearance;	PNF
(ii)	performs engine start procedure;	PF/PNF
(iii)	uses standard communication procedures with ground crew and ATC.	PF/PNF
(6)	perform taxi out:	(S) or (U)
(i)	receives, checks and adheres to taxi clearance;	PNF
(ii)	taxis the aircraft, including use of exterior lighting;	PF
(iii)	complies to taxi clearance;	PF/PNF
(iv)	maintains look-out for conflicting traffic and obstacles;	PF/PNF
(v)	operates thrust, brakes and steering;	PF
(vi)	conducts relevant briefings;	PF
(vii)	uses standard communication procedures with crew and ATC;	PNF
(viii)	completes standard operating procedures and checklists;	PF/PNF
(ix)	updates and confirms FMS data;	PF/PNF
(x)	manages changes in performance and departure route;	PF/PNF
(xi)	completes de or anti-ice procedures.	PF/PNF
(7)	manage abnormal and emergency situations:	(S) or (U)
(i)	identifies the abnormal condition;	PF/PNF
(ii)	interprets the abnormal condition;	PF/PNF
(iii)	performs the procedure for the abnormal condition.	PF/PNF
(8)	communicate with cabin crew, passengers and company:	(S) or (U)
(i)	communicates relevant information with cabin crew;	PF
(ii)	communicates relevant information with company;	PF/PNF
(iii)	makes passenger announcements when appropriate.	PF/PNF

Perform take-off

List of competency elements and performance criteria:

(1)	demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognising and managing potential threats and errors.		
(2)	perform pre-take-off and pre-departure preparation:		(S) or (U)
	(i)	checks and acknowledges line up clearance;	PF/PNF
	(ii)	checks correct runway selection ;	PF/PNF
	(iii)	confirms validity of performance data;	PF/PNF
	(iv)	checks approach sector and runway are clear;	PF/PNF
	(v)	confirms all checklists and take-off preparations completed;	PF/PNF
	(vi)	lines up the aircraft on centreline without losing distance;	PF
	(vii)	checks weather on departure sector;	PF/PNF
	(viii)	checks runway status and wind.	PF/PNF
(3)	perform take-off roll:		(S) or (U)
	(i)	applies take-off thrust;	PF
	(ii)	checks engine parameters;	PNF
	(iii)	checks air speed indicators;	PF/PNF
	(iv)	Stays on runway centreline.	PF
(4)	perform transition to instrument flight rules:		(S) or (U)
	(i)	applies V_1 procedures;	PF / PNF
	(ii)	rotates at V_r to initial pitch attitude;	PF
	(iii)	establishes initial wings level attitude;	PF
	(iv)	retracts landing gear;	PNF
	(v)	maintains climb out speed.	PF
(5)	perform initial climb to flap retraction altitude:		(S) or (U)
	(i)	sets climb power;	PF
	(ii)	adjusts attitude for acceleration;	PF
	(iii)	selects flaps according flap speed schedule;	PF/PNF
	(iv)	observes speed restrictions;	PF
	(v)	completes relevant checklists.	PF/PNF
(6)	perform rejected take-off:		(S) or (U)
	(i)	recognises the requirement to abort the take-off;	PF
	(ii)	applies the rejected take-off procedure;	PF
	(iii)	assesses the need to evacuate the aircraft.	PF/PNF

(7) perform navigation: (S) or (U)
- (i) complies to departure clearance; PF
- (ii) complies with published departure procedures, for example speeds; PF
- (iii) monitors navigation accuracy; PF/PNF
- (iv) communicates and coordinates with ATC. PNF

(8) manage abnormal and emergency situations: (S) or (U)
- (i) identifies the abnormal condition; PF/PNF
- (ii) interprets the abnormal condition; PF/PNF
- (iii) performs the procedure for the abnormal condition. PF/PNF

Perform climb

List of competency elements and performance criteria:

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

(2) perform SID or en-route navigation: (S) or (U)
- (i) complies with departure clearance and procedures; PF
- (ii) demonstrates terrain awareness; PF/PNF
- (iii) monitors navigation accuracy; PF/PNF
- (iv) adjusts flight to weather and traffic conditions; PF
- (v) communicates and coordinates with ATC; PNF
- (vi) observes minimum altitudes; PF/PNF
- (vii) selects appropriate level of automation; PF
- (viii) complies with altimeter setting procedures. PF/PNF

(3) complete climb procedures and checklists: (S) or (U)
- (i) performs the after take-off items; PF/PNF
- (ii) confirms and checks according checklists. PF/PNF

(4) modify climb speeds, rate of climb and cruise altitude: (S) or (U)
- (i) recognises the need to change speed, rate of climb or cruise altitude; PF
- (ii) selects and maintains the appropriate climb speed or rate of climb; PF
- (iii) selects optimum cruise flight level. PF/PNF

(5) perform systems operations and procedures: (S) or (U)
- (i) monitors operation of all systems; PF/PNF
- (ii) operates systems as required. PF/PNF

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

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

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

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

(i) communicates relevant information with cabin crew; PF

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

(iii) makes passenger announcements when appropriate. PF

Perform cruise

List of competency elements and performance criteria.

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

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

(i) demonstrates adequate area knowledge; PF/PNF

(ii) demonstrates adequate route knowledge; PF/PNF

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

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

(v) communicates and coordinates with ATC; PNF

(vi) observes minimum altitudes; PF/PNF

(vii) uses all means of automation. PF

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

(i) selects optimum speed; PF

(ii) selects optimum cruise flight level; PF

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

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

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

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

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

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

(iii) sets the FMS accordingly; PNF

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

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

(vi) identifies top of descent point. PF

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

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

(ii) operates systems as required. PNF

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

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

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

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

(i) communicates relevant information with cabin crew; PF

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

(iii) makes passenger announcements when appropriate. PF

Perform descent

List of competency elements and performance criteria:

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

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

(i) starts descent according to ATC clearance or optimum descent point; PF

(ii) selects optimum speed and descent rate; PF

(iii) adjusts speed to existing environmental conditions; PF

(iv) recognises the need to adjust the descent path; PF

(v) adjusts the flight path as required; PF

(vi) utilises all means of FMS descent information. PF

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

(i) complies with arrival clearance and procedures; PF

(ii) demonstrates terrain awareness; PF/PNF

(iii) monitors navigation accuracy; PF/PNF

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

(v) communicates and coordinates with ATC; PNF

(vi) observes minimum altitudes; PF/PNF

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

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

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

(i) re-checks destination weather and runway in use; PNF

(ii) briefs or re-briefs about instrument approach and landing as required; PF

(iii) reprograms the FMS as required; PNF

(iv) re-checks fuel status. PF/PNF

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

(i) identifies holding requirement; PF/PNF

(ii) programs FMS for holding pattern; PNF

(iii) enters and monitors holding pattern; PF

(iv) assesses fuel requirements and determines max holding time; PF/PNF

(v) reviews the need for a diversion; PF/PNF

(vi) initiates diversion. PF

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

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

(ii) operates systems as required. PF/PNF

(7) manage abnormal and emergency situations:

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

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

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

(i) communicates relevant information with cabin crew; PF

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

(iii) makes passenger announcements when appropriate; PF

Perform approach

List of competency elements and performance criteria:

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

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

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

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

(iii) selects optimum approach path; PF

(iv) operates controls smooth and coordinated; PF

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

(vi) performs relevant checklists; PF/PNF

(vii) initiates final descent; PF

(viii) achieves stabilised approach criteria; PF

(ix) ensures adherence to minima; PF/PNF

	(x)	initiates go-around if required;	PF
	(xi)	masters transition to visual segment.	PF
(3)	perform precision approach:		(S) or (U)
	(i)	performs ILS approach;	PF
	(ii)	performs MLS approach.	PF
(4)	perform non-precision approach:		(S) or (U)
	(i)	performs VOR approach;	PF
	(ii)	performs NDB approach;	PF
	(iii)	performs SRE approach;	PF
	(iv)	performs GNSS approach;	PF
	(v)	performs ILS loc approach;	PF
	(vi)	performs ILS back beam approach.	PF
(5)	perform approach with visual reference to ground:		(S) or (U)
	(i)	performs standard visual approach;	PF
	(ii)	performs circling approach.	PF
(6)	monitor the flight progress:		(S) or (U)
	(i)	insures navigation accuracy;	PF/PNF
	(ii)	communicates with ATC and crew members;	PNF
	(iii)	monitors fuel status.	PF/PNF
(7)	perform systems operations and procedures:		
	(i)	monitors operation of all systems;	PF
	(ii)	operates systems as required.	PF
(8)	manage abnormal and emergency situations:		(S) or (U)
	(i)	identifies the abnormal condition;	PF/PNF
	(ii)	interprets the abnormal condition;	PF/PNF
	(iii)	performs the procedure for the abnormal condition.	PF/PNF
(9)	perform missed approach and go-around:		(S) or (U)
	(i)	initiates go-around procedure;	PF
	(ii)	navigates according to missed approach procedure;	PF
	(iii)	completes the relevant checklists;	PF/PNF
	(iv)	initiates approach or diversion after the go-around;	PF
	(v)	communicates with ATC and crew members.	PNF
(10)	communicate with cabin crew, passengers and company:		(S) or (U)
	(i)	communicates relevant information with cabin crew;	PF
	(ii)	communicates relevant information with company;	PF/PNF
	(iii)	makes passenger announcements	

when appropriate; PF

(iv) initiates go-around procedure. PF

Perform landing

List of competency elements and performance criteria:

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

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

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

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

(iii) initiates flare; PF

(iv) controls thrust; PF

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

(vi) lowers nose wheel; PF

(vii) maintains centreline; PF

(viii) performs after-touchdown procedures; PF

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

(x) vacates runway with taxi speed. PF

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

(i) monitors operation of all systems; PF

(ii) operates systems as required. PF

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

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

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

Perform after landing and post flight operations

List of competency elements and performance criteria:

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

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

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

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

(iii) controls taxi speed; PF/PNF

(iv) maintains centreline; PF

	(v)	maintains look-out for conflicting traffic and obstacles;	PF
	(vi)	identifies parking position;	PF/PNF
	(vii)	complies with marshalling or stand guidance;	PF/PNF
	(viii)	applies parking and engine shut down procedures;	PF
	(ix)	completes with relevant checklists.	PF/PNF
(3)	perform aircraft post-flight operations:		(S) or (U)
	(i)	communicates to ground personnel and crew;	PF
	(ii)	completes all required flight documentation;	PF/PNF
	(iii)	ensures securing of the aircraft;	PF
	(iv)	conducts the debriefings.	PF
(4)	perform systems operations and procedures:		(S) or (U)
	(i)	monitors operation of all systems;	PF/PNF
	(ii)	operates systems as required.	PF/PNF
(5)	manage abnormal and emergency situations:		(S) or (U)
	(i)	identifies the abnormal condition;	PF/PNF
	(ii)	interprets the abnormal condition;	PF/PNF
	(iii)	performs the procedure for the abnormal condition.	PF/PNF
(6)	communicate with cabin crew, passengers and company:		(S) or (U)
	(i)	communicates relevant information with cabin crew;	PF
	(ii)	communicates relevant information with company;	PF/PNF
	(iii)	makes passenger announcements when appropriate.	PF

Principles of threat and error management

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

(1) The components of the TEM model:

There are three basic components in the TEM model, from the perspective of flight crews: threats, errors and undesired aircraft states. The model proposes that threats 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:

(i) Threats are defined as events or errors that occur beyond the influence of the flight crew, increase operational complexity, and which must be

managed to maintain the margins of safety. During typical flight operations, flight crews have to manage various contextual complexities. Such complexities would include, for example, dealing with adverse meteorological conditions, airports surrounded by high mountains, congested airspace, aircraft malfunctions, errors committed by other people outside of the cockpit, such as air traffic controllers, flight attendants or maintenance workers, and so forth. The TEM model considers these complexities as threats because they all have the potential to negatively affect flight operations by reducing margins of safety;

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

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

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

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

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

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

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

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

(3) Errors:

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

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

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

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

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

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

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

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

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

(4) Undesired aircraft states:

(i) Undesired aircraft states are flight crew-induced aircraft position or speed deviations, misapplication of flight controls, or incorrect systems configuration, associated with a reduction in margins of safety. Undesired aircraft states that result from ineffective threat or error management may lead to compromising situations and reduce margins of safety in flight

operations. Often considered at the cusp of becoming an incident or accident, undesired aircraft states must be managed by flight crews;

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

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

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

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

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

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

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

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

(5) Countermeasures:

(i) Flight crews must, as part of the normal discharge of their operational duties, employ countermeasures to keep threats, errors and undesired aircraft states from reducing margins of safety in flight operations. Examples of countermeasures would include checklists, briefings, call-outs and SOPs, as well as personal strategies and tactics. Flight crews dedicate significant amounts of time and energies to the application of countermeasures to ensure margins of safety during flight operations. Empirical observations during training and checking suggest that as much as 70% of flight crew activities may be countermeasures-related activities.

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

(A) ACAS;

(B) TAWS;

(C) SOPs;

(D) checklists;

(E) briefings;

(F) training;

(G) etc.

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

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

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

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

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

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

Table 4. Examples of individual and team countermeasures

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

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

(a) application of knowledge;

(b) application of regulations and procedures;

(c) communication;

(d) aeroplane flight path management – automation;

(e) aeroplane flight path management – manual control;

(f) leadership and teamwork;

(g) problem-solving and decision-making;

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

(i) workload management.

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

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

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

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

AMC1 to Appendix 6 Modular training course for the IR

All modular flying training courses for the IR, except competency- based modular flying training course

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

The 150 hours of theoretical knowledge instruction can include classroom work, interactive video, slide or tape presentation, learning carrels, computer-based training, and other media as approved by the Kuwait DGCA, in suitable proportions. Approved distance learning (correspondence) courses may also be offered as part of the course.

AMC2 to Appendix 6 Modular training courses for the IR

Section A IR(A) - modular flying training course

Basic instrument flight module training course

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

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

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

The use of the BITD is subject to the following:

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

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

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

Exercises

Exercise 1:

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

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

(3) maintaining straight and level flight;

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

(5) roll-out onto predetermined headings.

Exercise 2:

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

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

(3) climbing and descending turns.

Exercise 3:

Instrument pattern: 0:45 hours

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

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

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

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

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

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

(7) initiate go-around;

(8) climb at best rate of climb speed.

Exercise 4:

Repetition of exercise 1 and steep turns with 45° bank; 0:45 hours

recovery from unusual attitudes.

Exercise 5:

Repetition of exercise 4. 0:45 hours

Exercise 6:

(1) radio navigation using VOR, NDB 0:45 hours
or, if available, VDF;

(2) interception of predetermined QDM, QDR.

Exercise 7:

Repetition of exercise 1 and recovery from unusual attitudes. 0:45 hours

Exercise 8:

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

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

Exercise 9:

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

Exercise 10: Repetition of exercises 6, 8 and 9. 3:30 hours

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

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

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

AMC3 to Appendix 6 Modular training courses for the IR

Section A IR(A) – Competency-based modular flying training course

Theoretical knowledge instruction

(1) The theoretical knowledge instruction may be given at an approved training organisation conducting theoretical knowledge instruction only, in which case

the Head of Training of that organisation should supervise that part of the course.

(2) The required theoretical knowledge instruction for the IR following the competency-based route may contain computer-based training, e-learning elements, interactive video, slide/tape presentation, learning carrels and other media as approved by the Kuwait DGCA, in suitable proportions. Approved distance learning (correspondence) courses may also be offered as part of the course. The minimum amount of classroom teaching has to be provided as required by ORA.ATO.305.

Theoretical knowledge examination

The applicant for the IR following the competency-based training route should pass an examination to demonstrate a level of theoretical knowledge appropriate to the privileges granted in the subjects further detailed in FCL.615(b). The number of questions per subject, the distribution of questions and the time allocated to each subject is detailed in AMC2 ARA.FCL.300(b).

AMC4 to Appendix 6 Modular training courses for the IR

Section A IR(A) – Competency-based modular flying training course flying training

The instrument flight instruction outside an ATO provided by an IRI(A) or an FI(A) holding the privilege to provide training for the IR in accordance with Appendix 6 Section Aa (6)(a)(i)(A) may consist of instrument flight time under instruction or instrument ground time or a combination thereof.

Training aircraft

The aeroplane used for the instrument flight training provided outside an ATO by an IRI(A) or FI(A) should be:

(1) fitted with primary flight controls that are instantly accessible by both the student and the instructor (for example dual flight controls or a centre control stick). Swing-over flight controls should not be used; and

(2) suitably equipped to simulate instrument meteorological conditions (IMC) and for the instrument flight training required.

The FSTD used for the instrument flight instruction provided outside an ATO by an IRI(A) or FI(A) should be suitably equipped to simulate instrument meteorological conditions (IMC) and for the instrument flight training required.

AMC5 to Appendix 6 Modular training courses for the IR

Section A IR(A) – Competency-based modular flying training course (6)(a)(i)(B); (6)(b)(i)(B)

Prior experience of flight time under IFR as PIC

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

(a) an EIR rating issued by the Kuwait DGCA; or

(b) a national instrument rating issued by the Kuwait DGCA prior to the application of Part FCL; or

(c) an instrument rating issued in compliance with the requirements of Annex 1 to the Chicago Convention by a country other than the State of Kuwait; or

(d) an authorisation issued by a State under Article 4(8) of KCASR Basic Regulation.

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

AMC6 to Appendix 6 Modular training courses for the IR

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

Prior instrument flight time under instruction

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

(a) an EIR rating issued by the Kuwait DGCA; or

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

(c) an instrument rating in compliance with the requirements of Annex 1 to the Chicago Convention by a country other than the State of Kuwait; or

(d) an authorisation issued by a State under Article 4(8) of KCASR Basic Regulation.

AMC7 to Appendix 6 Modular training courses for the IR

Section A IR(A) – Competency-based modular flying training COURSE (6)(c); (6)(d)

Pre-entry assessment and training record

Pre-entry assessment

The assessment to establish the amount of training to be credited and to identify the training needs should be based on the training syllabus established in Appendix 6 Aa.

Training record

(1) Before initiating the assessment the applicant should provide to an ATO a training record containing the details of the previous flight instruction provided by the IRI(A) or the FI(A). This training record should at least specify the aircraft type and registration used for the training, the number of flights and the total amount of instrument time under instruction. It should also specify all the exercises completed during the training by using the syllabus contained in Appendix 6 Aa.

(2) The instructor having provided the training should keep the training records containing all the details of the flight training given for a period of at least 5 years after the completion of the training.

AMC8 to Appendix 6 Modular training courses for the IR

Section A IR(A) – Competency-based modular flying training course (8)

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

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

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

AMC9 to Appendix 6 Modular training courses for the IR

Airships

Basic instrument flight module training course

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

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

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

The use of the BITD is subject to the following:

the training should be complemented by exercises on an airship;

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

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

Exercises

Exercise 1:

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

(2) horizontal flight;

(3) maintaining straight and level flight;

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

(5) rollout onto predetermined headings.

Exercise 2:

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

(2) maintaining heading and speed;

(3) transition to horizontal flight;

(4) climbing and descending turns.

Exercise 3:

Instrument pattern: 0:45 hours

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

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

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

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

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

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

(7) initiate go-around;

(8) climb at best rate of climb speed.

Exercise 4:

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

(2) recovery from unusual attitudes.

Exercise 5

Repetition of exercise 4. 0:45 hours

Exercise 6

(1) radio navigation using VOR, NDB or, if available, VDF; 0:45 hours

(2) interception of predetermined QDM, QDR.

Exercise 7

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

(2) recovery from unusual attitudes.

Exercise 8

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

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

Exercise 9

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

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

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

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

GM1 to Appendix 6 Modular training courses for the IR

Aa. IR(A)(8)

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

(a) AIR LAW:

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

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

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

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

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

(6) describe the solutions when omnidirectional procedures are not possible;

(7) justify the establishment of aircraft categories for the approach;

(8) state the minimum obstacle clearance provided by the minimum sector altitudes (MSAs) established for an aerodrome;

(9) describe the point of origin, shape, size, and subdivisions of the area used for MSAs;

(10) explain why a pilot should not descend below obstacle clearance altitude/height (OCA/H) without visual reference, which is established for precision approach procedures, non-precision approach procedures and visual (circling) procedures;

(11) translate the following acronyms into plain language: decision altitude (DA), decision height (DH), obstacle clearance altitude (OCA), obstacle clearance height (OCH), minimum decision altitude (MDA), minimum decision height (MDH), minimum obstacle clearance (MOC), decision altitude/height (DA/H), obstacle clearance altitude/height (OCA/H) and minimum decision altitude/height (MDA/H);

(12) explain the relationship between the following: DA, DH, OCA, OCH, MDA, MDH, MOC, DA/H, OCA/H and MDA/H;

(13) define the following terms: initial approach fix (IAF), intermediate fix (IF), final approach fix (FAF), missed approach point (MAPt) and turning point;

(14) state the accuracy of facilities providing track (omnidirectional radio range (VOR), instrument landing system (ILS), non-directional beacon (NDB));

(15) state the optimum descent gradient (preferred for a precision approach) in degrees and per cent;

(16) name the five standard segments of an instrument approach procedure and state the beginning and end for each of them;

(17) describe where an arrival (ARR) route normally ends;

(18) state whether or not omnidirectional or sector ARRs are possible to be made;

(19) explain the main task of the initial approach segment;

(20) describe the main task of the intermediate approach segment;

(21) state the main task of the final approach segment;

(22) name the two possible aims of a final approach;

(23) explain the term ‘final approach point’ in case of an ILS approach;

(24) state what happens if an ILS glide path (GP) becomes inoperative during approach;

(25) describe the main task of a missed approach procedure;

(26) define ‘MAPt’;

(27) state the pilot’s reaction if upon reaching the MAPt, the required visual reference is not established;

(28) describe what a pilot is expected to do in the event that a missed approach is initiated prior to arriving at the MAPt (a missed approach, after an approach flown as CDFA, should be made when reaching the MAPt or DA/H, whichever occurs first);

(29) state whether the pilot is obliged to cross the MAPt at the A/H required by the procedure or whether they are allowed to cross the MAPt at an A/H greater than that required by the procedure;

(30) describe what is meant by ‘visual manoeuvring (circling)’;

(31) state the conditions to be fulfilled before descending below MDA/H in a visual manoeuvring (circling) approach;

(32) state how the pilot is expected to behave after initial visual contact during a visual manoeuvring (circling);

(33) describe what the pilot is expected to do if visual reference is lost while circling to land from an instrument approach;

(34) describe the shape and terminology associated with the holding pattern;

(35) state the bank angle and rate of turn to be used whilst flying in a holding pattern;

(36) explain why pilots in a holding pattern should attempt to maintain tracks and how this is achieved;

(37) describe where outbound timing begins in a holding pattern;

(38) state where the outbound leg in a holding pattern terminates if the outbound leg is based on distance-measuring equipment (DME);

(39) describe the three entry headings for entries into a holding pattern;

(40) define the terms ‘parallel entry’, ‘offset entry’, and ‘direct entry’;

(41) determine the correct entry procedure for a given holding pattern;

(42) state the still-air time for flying on the outbound entry heading with or without DME;

(43) define the following Q codes: ‘QNH’ and ‘QFE’;

(44) define ‘flight level’ (FL);

(45) state the intervals by which consecutive FLs should be separated;

(46) describe how FLs are numbered;

(47) define the term ‘transition altitude’;

(48) define the term ‘transition level’;

(49) state how the vertical position of the aircraft should be expressed at or below the transition altitude and transition level;

(50) define the term ‘transition layer’;

(51) state when the QNH altimeter setting should be made available to departing aircraft;

(52) state how a QNH altimeter setting should be made available to aircraft approaching a controlled aerodrome for landing;

(53) state where during the climb, the altimeter setting should be changed from QNH to 1013.2 hPa;

(54) describe when a pilot of an aircraft intending to land at an aerodrome should obtain the transition level;

(55) describe when a pilot of an aircraft intending to land at an aerodrome should obtain the actual QNH altimeter setting;

(56) state where the altimeter settings should be changed from 1013.2 hPa to QNH during descent for landing;

(57) state the modes and codes that the pilot should operate in the absence of any air traffic control (ATC) directions or regional air navigation agreements;

(58) state when the pilot should 'squawk ident';

(59) state the transponder mode and code to indicate: a state of emergency, a failure in communications, an unlawful interference;

(60) describe the consequences of an in-flight transponder failure;

(61) state the primary action of the pilot in the case of an unserviceable transponder before departure when no repair or replacement at that aerodrome is possible;

(62) understand the various rules and services that apply to the various classes of airspace;
(63) describe the aim of clearances issued by the ATC with regard to instrument flight rules (IFR), visual flight rules (VFR) or special VFR flights, and refer to the different airspaces;
(64) explain what is meant by the expression 'clearance limit';
(65) explain the meaning of the phrases 'cleared via flight planned route', 'cleared via (designation) departure' and 'cleared via (designation) ARR' in an ATC clearance;
(66) list which items of an ATC clearance should always be read back by the flight crew;
(67) justify the speed control by the ATC;
(68) explain how the change from IFR to VFR may be initiated by the pilot in command (PIC);
(69) define the following terms: 'transition level', 'transition layer', and 'transition altitude';
(70) indicate how the vertical position of an aircraft in the vicinity of an aerodrome should be expressed at or below the transition altitude, at or above the transition level, and while climbing or descending through the transition layer;
(71) list the six items that are normally included in a voice position report;
(72) name the item of a position report which must be forwarded to the ATC with the initial call after changing to a new frequency;
(73) understand the difference among the types of separation within the various classes of airspace and among the various types of flight;
(74) state who is responsible for the avoidance of collision with other aircraft when operating in visual meteorological conditions (VMC);
(75) explain the term 'expected approach time' and the procedures for its use;
(76) state the reasons which may probably lead to the decision to use another take-off or landing direction than the one into the wind;
(77) define the term 'radar vectoring';
(78) explain the procedures for the conduct of surveillance radar approaches (SRAs);
(79) state the mode and code of secondary surveillance radar (SSR) equipment that a pilot may operate in a (general) state of emergency, or (specifically) in case the aircraft is subject to unlawful interference;

(80) describe the expected action of the aircraft after receiving a broadcast from air traffic services (ATS) concerning the emergency descent of another aircraft;
(81) name the colours used for the various markings (runway (RWY), taxiway (TWY), aircraft stands, apron safety lines);
(82) describe the application and characteristics of RWY centre line markings and threshold markings;
(83) describe the wing bars of a precision approach path indicator (PAPI) and an abbreviated precision approach path indicator (A-PAPI); and
(84) interpret what the pilot sees during approach, using a PAPI, an APAPI, a T visual approach slope indicating system (TVASIS), and an abbreviated T visual approach slope indicator system (ATVASIS);

(b) FLIGHT PLANNING AND FLIGHT MONITORING:

(1) select the preferred airway(s) or route(s) considering:

(i) altitudes and FLs,

(ii) standard routes,

(iii) ATC restrictions,

(iv) the shortest distance,

(v) obstacles, and

(vi) any other relevant data;

(2) determine courses and distances from en route charts;

(3) determine bearings and distances of waypoints based on radio navigation aids on en route charts;

(4) define the following altitudes:

(i) minimum en route altitude (MEA),

(ii) minimum obstacle clearance altitude (MOCA),

(iii) minimum off-route altitude (MORA),

(iv) grid minimum off-route altitude (Grid MORA),

(v) maximum authorised altitude (MAA),

(vi) minimum crossing altitude (MCA), and

(vii) minimum holding altitude (MHA);

(5) extract the following altitudes from the chart(s):

(i) MEA,

(ii) MOCA,

(iii) MORA,

(iv) Grid MORA,

(v) MAA,

(vi) MCA, and

(vii) MHA;

(6) explain the reasons for studying standard instrument departure (SID) and standard ARR (STAR) charts;

(7) state the reasons why the SID and STAR charts show procedures only in a pictorial presentation style which is not to scale;

(8) interpret all data and information represented on SID and STAR charts, particularly:

(i) routings,

(ii) distances,

(iii) courses,

(iv) radials,

(v) altitudes/levels,

(vi) frequencies, and

(vii) restrictions;

(9) identify SIDs and STARs which may be relevant to a planned flight;

(10) state the reasons why it is imperative to be familiar with instrument approach procedures and appropriate data for departure, destination, and alternate airfields prior to departure;

(11) select instrument approach procedures appropriate for departure, destination, and alternate airfields;

(12) interpret all procedures, data and information represented on instrument approach charts, particularly:

(i) courses and radials,

(ii) distances,

(iii) altitudes, levels or heights,

(iv) restrictions,

(v) obstructions,

(vi) frequencies,

(vii) speeds and times,

(viii) DA/Hs and MDA/H,

(ix) visibility and runway visual ranges (RVRs), and

(x) approach light systems;

(13) find communications (COM) frequencies and call signs for the following:

(i) control agencies, service facilities, and flight information services (FISs),

(ii) weather information stations, and

(iii) automatic terminal information service (ATIS);

(14) find the frequency and/or identifiers of radio navigation aids;

(15) complete the navigation plan with the courses, distances, and frequencies taken from charts;

(16) find standard instrument departure and ARR routes to be flown or to be expected;

(17) determine the position of top of climb (TOC) and top of descent (TOD), considering appropriate data;

(18) determine variation and calculate magnetic/true courses;

(19) calculate true airspeed (TAS) according to given aircraft performance data, altitude, and outside air temperature (OAT);

(20) calculate wind correction angles (WCA)/drift and ground speeds (GSs);

(21) determine all relevant altitudes/levels, particularly MEA, MOCA, MORA, MAA, MCA, MRA, and MSA;

(22) calculate individual and accumulated times for each leg until destination and alternate airfields;

(23) convert between volume, mass, and density given in different units commonly used in aviation;

(24) determine relevant data from the flight manual, such as fuel capacity, fuel flow/consumption at different power/thrust settings, altitudes, and atmospheric conditions;

(25) calculate attainable flight time/range considering fuel flow/consumption and available amount of fuel;

(26) calculate the required fuel considering fuel flow/consumption and required time/range to be flown;

(27) calculate the required fuel for an IFR flight considering expected meteorological conditions and expected delays under defined conditions;

(28) find and analyse the latest state at the departure, destination, and alternate aerodromes, in particular with regard to:

(i) opening hours,

(ii) work in progress (WIP),

(iii) special procedures due to WIP,

(iv) obstructions, and

(v) changes of frequencies for COM, navigation aids, and facilities;

(29) find and analyse the latest en route state with regard to:

(i) airway(s) or route(s),

(ii) restricted, dangerous, and prohibited areas, and

(iii) changes of frequencies for COM, navigation aids, and facilities;

(30) state the reasons for a fixed format of an International Civil Aviation Organization (ICAO) air traffic services flight plan (ATS FPL);

(31) determine the correct entries to complete an FPL, as well as decode and interpret the entries in a completed FPL, particularly as regards the following:

(i) aircraft identification (Item 7),

(ii) flight rules and type of flight (Item 8),

(iii) number and type of aircraft and wake turbulence category (Item 9),

(iv) equipment (Item 10),

(v) departure aerodrome and time (Item 13),

(vi) route (Item 15),

(vii) destination aerodrome, total estimated elapsed time, and alternate aerodrome (Item 16),

(viii) other information (Item 18), and

(ix) supplementary information (Item 19);

(32) complete the FPL using information from the following:

(i) navigation plan,

(ii) fuel plan, and

(iii) operator's records on basic aircraft information;

(33) explain the requirements for the submission of an ATS FPL;

(34) explain the action to be taken in case of FPL changes;

(35) state the action to be taken in case of inadvertent changes to track, TAS, and time estimate, affecting the current FPL; and

(36) explain the procedures for closing an FPL;

(c) METEOROLOGY:

(1) describe qualitatively and quantitatively the temperature lapse rates of the troposphere (mean value of 0.65 °C/100 m or 2 °C/1 000 ft and actual values);

(2) explain the characteristics of inversions and of an isothermal layer;

(3) explain the cooling and warming of the air on the earth or sea surfaces;

(4) describe qualitatively the influence of the clouds on the cooling and warming of the earth or sea surfaces as well as of the air near those surfaces;

(5) explain the influence of the wind on the cooling and warming of the air near the earth or sea surfaces;

(6) define 'atmospheric pressure';

(7) list the units of measurement of atmospheric pressure used in aviation (hPa, in.);

(8) describe isobars on the surface weather charts;

(9) explain the pressure variation with height;

(10) describe qualitatively the variation of the barometric lapse rate (note: the average value for the barometric lapse rate near mean sea level is 27 ft (8 m) per 1 hPa, whereas at about 5 500 m above mean sea level (AMSL) is 50 ft (15 m) per 1 hPa;

(11) describe and interpret contour lines (isohypses) on a constant pressure chart;

(12) describe the relationship between pressure, temperature, and density;

(13) describe the vertical variation of the air density in the atmosphere;

(14) describe the effect of humidity changes on the air density;

(15) explain the use of standardised values for the international standard atmosphere (ISA);

(16) list the main values of ISA (mean sea level pressure, mean sea level temperature, a vertical temperature lapse rate up to 20 km, as well as height and temperature of the tropopause);

(17) calculate the standard temperature in Celsius degrees for a given FL;

(18) determine a standard temperature deviation based on the difference between the given OAT and the standard temperature;

(19) define the following terms and acronyms and explain how they are related to each other: H, A, pressure A, FL, pressure level, true A, true H, elevation, QNH, QFE, and standard altimeter setting;

(20) describe the following terms: transition A, transition level, transition layer, terrain clearance, and lowest usable FL;

(21) calculate the different readings on the altimeter when the pilot changes the altimeter setting;

(22) illustrate with a numbered example the changes of the altimeter setting and the associated changes in reading when the pilot climbs through the transition altitude or descends through the transition level;

(23) derive the reading of the altimeter of an aircraft on the ground when the pilot uses different settings;

(24) explain the influence of the air temperature on the distance between the ground and the level reading on the altimeter as well as between two FLs;

(25) explain the influence of pressure areas on the true altitude;

(26) determine the true A/H for a given A/H and a given ISA temperature deviation;

(27) describe why and how the wind changes direction and speed with H in the friction layer in the northern and southern hemisphere (rule of thumb);

(28) describe and explain the origin and formation of mountain waves;

(29) explain how mountain waves may be identified through their associated meteorological phenomena;

(30) describe turbulence and gustiness;

(31) list common types of turbulence (convective, mechanical, orographic, frontal, and clear-air turbulence);

(32) indicate the sources of atmospheric humidity;

(33) define ‘dew point’;

(34) define ‘relative humidity’;

(35) describe the relationship between temperature and dew point;

(36) estimate the relative humidity of the air based on the difference between dew point and temperature;

(37) explain the influence of relative humidity on the H of the cloud base;

(38) list cloud types typical for stable and unstable air conditions;

(39) identify by shape cirriform, cumuliform, and stratiform clouds;

(40) explain the influence of inversions on vertical movements in the atmosphere;

(41) name the factors contributing in general to the formation of fog and mist;

(42) name the factors contributing to the formation of haze;

(43) describe significant characteristics of orographic fog;

(44) summarise the conditions for the dissipation of orographic fog;

(45) list and describe the types of precipitation given in the aerodrome forecast (TAF) and aerodrome routine meteorological report (METAR) codes (drizzle, rain, snow, snow grains, ice pellets, hail, small hail, snow pellets, ice crystals, freezing drizzle, and freezing rain);

(46) assign typical precipitation types and intensities to different clouds;

(47) describe the boundaries between air masses (fronts);

(48) define ‘front’ and ‘frontal surface’ (‘frontal zone’);

(49) define ‘warm front’;

(50) describe the cloud, weather, ground visibility, and aviation hazards at a warm front depending on the stability of the warm air;

(51) explain the seasonal differences in the weather at warm fronts;

(52) describe the structure, slope, and dimensions of a warm front;

(53) define ‘cold front’;

(54) explain the seasonal differences in the weather at cold fronts;

(55) describe the structure, slope, and dimensions of a cold front;

(56) describe the cloud, weather, ground visibility, and aviation hazards in a warm sector;

(57) describe the cloud, weather, ground visibility, and aviation hazards behind the cold front;

(58) define the term ‘occlusion’;

(59) identify the typical flat pressure pattern on a surface weather chart;

(60) describe the weather associated with a flat pressure pattern;

(61) explain the general weather conditions under which ice accretion on airframe occurs;

(62) indicate in which circumstances ice may form on an aircraft on the ground: air temperature, humidity, precipitation;

(63) explain in which circumstances ice may form on an aircraft in flight: inside clouds, in precipitation, outside clouds, and in the absence of precipitation;

(64) describe the different factors influencing the intensity of icing: air temperature, amount of supercooled water in a cloud or in precipitation, amount of ice crystals in the air, speed of the aircraft, shape (thickness) of the airframe parts (wings, antennas, etc.);

(65) define ‘clear ice’;

(66) define ‘rime ice’;

(67) define ‘hoar frost’;

(68) state the ICAO qualifying terms for the intensity of icing;

(69) describe in general the hazards of icing;

(70) assess the dangers of the different types of ice accretion;

(71) state the ICAO qualifying terms for the intensity of turbulence;

(72) describe the effects of turbulence on an aircraft in flight;

(73) indicate the possibilities of avoiding turbulence

(i) in the flight planning: weather briefing, choice of track, and altitude, and

(ii) during flight: choice of appropriate track and altitude;

(74) define ‘wind shear’ (vertical and horizontal);

(75) describe the conditions in which wind shear forms and how it forms (e.g. thunderstorms, squall lines, fronts, inversions, land and sea breeze, friction layer, and relief);

(76) describe the effects of wind shear on flight;

(77) indicate the possibilities of avoiding wind shear in flight:

(i) in the flight planning, and

(ii) during flight;

(78) name the cloud types which indicate the development of thunderstorms;

(79) describe the different types of thunderstorms, their location, the conditions for and the process of their development, and list their properties (air mass thunderstorms, frontal thunderstorms, squall lines, supercell storms, orographic thunderstorms);

(80) assess the average duration of thunderstorms and their different stages;

(81) summarise the flight hazards of a fully developed thunderstorm;

(82) describe and assess ‘St. Elmo’s fire’;

(83) describe the effect of lightning strike on aircraft and flight execution;

(84) describe practical examples of flight techniques used to avoid the hazards of thunderstorms;

(85) describe the influence of a mountainous terrain on cloud and precipitation;

(86) describe the effects of the foehn;

(87) describe the influence of a mountainous area on a frontal passage;

(88) indicate the turbulent zones (mountain waves, rotors) on a sketch of a mountain chain;

(89) describe the reduction of visibility caused by precipitation (drizzle, rain, and snow);

(90) describe the differences between ground visibility, flight visibility, slant visibility, and vertical visibility when an aircraft is above or within a layer of haze or fog;

(91) define ‘ground visibility’;

(92) list the units used for visibility (m, km);

(93) define ‘RVR’;

(94) list the units used for RVR (m);

(95) compare visibility and RVR;

(96) define ‘ceiling’;

(97) name the unit and the reference level used for information about the cloud base (ft);

(98) define ‘vertical visibility’;

(99) name the unit used for vertical visibility (ft);

(100) interpret ground-weather radar images;

(101) describe the basic principle of airborne weather radars as well as the type of information they provide;

(102) describe the limits and errors of airborne weather radar information;

(103) interpret typical airborne weather radar images;

(104) decode and interpret significant weather charts (low-, medium-, and high-level charts);

(105) describe the flight conditions at designated locations or along a defined flight route at a given FL, based on a significant weather chart;

(106) describe, decode (by using a code table), and interpret the following aviation weather messages (given in written or graphical format):

(i) METAR;

(ii) aerodrome special meteorological reports (SPECI);

(iii) trend forecast (TREND);

(iv) TAF;

(v) information concerning en route weather phenomena which may affect the safety of aircraft operations (SIGMET);

(vi) information concerning en route weather phenomena which may affect the safety of low-level aircraft operations (AIRMET);

(vii) area forecast for low-level flights (GAMET);

(viii) automatic terminal information service (ATIS);

(ix) meteorological information for aircraft in flight (VOLMET);

(x) special air-report, and

(xi) volcanic-ash advisory information;

(107) list in general the cases where a SIGMET and an AIRMET are issued; and

(108) describe, decode (by using a code table), and interpret the following messages: runway state message (as written in a METAR) and general aviation forecast (GAFOR).

GM1 to Appendix 7 IR skill test

To the skill test, an ME centreline thrust aeroplane is considered an SE aeroplane.

AMC1 to Appendix 7 IR skill test

LAPL, BPL, SPL, PPL, CPL, IR skill test and proficiency check application and report form

APPLICATION AND REPORT FORM			
LAPL, BPL, SPL, PPL, CPL, IR SKILL TEST AND PROFICIENCY CHECK			
Applicant's last name(s):			
Applicant's first name(s):			**LAPL: A ☐ H ☐ B ☐ S ☐**
Signature of applicant:			**BPL: ☐ SPL: ☐**
Type of licence*:			**PPL: A ☐ H ☐ As ☐**
Licence number*:			**CPL: A ☐ H ☐ As ☐**
State:			**IR: A ☐ H ☐ As ☐**
1	**Details of the flight**		
Group, class, type of aircraft:		**Registration:**	
Aerodrome or site:	**Take-off time:**	**Landing time:**	**Flight time:**

		Total flight time:	

2	Result of the test		
Skill test details:			
Pass ☐	Fail ☐	Partial pass ☐	
3	Remarks		
Location and date:			
Examiner's certificate number *:		Type and number of licence:	
Signature of examiner:		Name(s) in capital letters:	

* if applicable

AMC1 to Appendix 9 Training, skill test and proficiency check for MPL, ATPL, type and class ratings, and proficiency check for IRs

Application and report form

If applicable, this form is also the certificate of completion of the type rating course for ZFTT.

APPLICATION AND REPORT FORM			
ATPL, MPL, TYPE RATING, TRAINING, SKILL TEST AND PROFICIENCY CHECK AEROPLANES (A) AND HELICOPTERS (H)			
Applicant's last name(s):	Aircraft:	SE-SP: A ☐ H ☐	ME-SP: A ☐ H ☐
Applicant's first name(s):		SE-MP: A ☐ H ☐	ME-MP: A ☐ H ☐
Signature of applicant:	Operations:	SP ☐	MP ☐
Type of licence held:	Checklist:	Training record: ☐	Type rating: ☐

Licence number:		**Skill test:** ☐	**Class rating:** ☐
State of licence issue:		**IR:** ☐	
		Proficiency check: ATPL: ☐ **MPL:** ☐	

1	**Theoretical training for the issue of a type or class rating performed during period**		
From:	**To:**	**At:**	
Mark obtained:	**% (Pass mark 75%):**	**Type and number of licence:**	
Signature of HT:		**Name(s) in capital letters:**	

2	**FSTD**		
FSTD (aircraft type):	**Three or more axes:** **Yes** ☐ **No** ☐		**Ready for service and used:**
FSTD manufacturer:	**Motion or system:**		**Visual aid: Yes** ☐ **No** ☐
FSTD operator:			**FSTD ID code:**

Total training time at the controls:	**Instrument approaches at aerodromes to a decision altitude or height of:**
Location, date and time:	**Type and number of licence:**
Type rating instructor ☐ **Class rating instructor** ☐ **…… instructor** ☐	
Signature of instructor:	**Name(s) in capital letters:**

3	**Flight training: in the aircraft** ☐ **in the FSTD (for ZFTT)** ☐		
Type of aircraft:	**Registration:**	**Flight time at the controls:**	
Take-offs:	**Landings:**	**Training aerodromes or sites (take-offs, approaches and landings):**	
Take-off time:		**Landing time:**	
Location and date:		**Type and number of licence held:**	
Type rating instructor ☐ **Class rating instructor** ☐			
Signature of instructor:		**Name(s) in capital letters:**	

4	**Skill test** ☐ **Proficiency check** ☐
Skill test and proficiency check details:	
Aerodrome or site:	**Total flight time:**

Take-off time:		**Landing time:**
Pass ☐	**Fail** ☐	**Reason(s) why, if failed:**
Location and date:		**SIM or aircraft registration:**
Examiner's certificate number (if applicable):		**Type and number of licence:**
Signature of examiner:		**Name(s) in capital letters:**

AMC2 to Appendix 9 Training, skill test and proficiency check for MPL, ATPL, type and class ratings, and proficiency check for IRs

Training, skill test and proficiency check: SP aeroplanes

Section 3.B of the training and skill test and proficiency check content for SP aeroplanes included in Appendix 9.B should include training on a circling approach, after an IFR approach.

GM1 to Appendix 9 Training, skill test and proficiency check for MPL, ATPL, type and class ratings, and proficiency check for IRs

TYPE SPECIFIC UPRT AND GO-AROUND TRAINING IN FSTD

(a) General

(1) The upset recovery training exercises should be mainly manoeuvre-based but may include some scenario-based training elements. The manoeuvre-based training enables type rating applicants to apply their handling skills and recovery strategy whilst leveraging CRM principles to return the aeroplane from an upset condition to a stabilised flight path.

(2) If training is conducted in an FSTD, it is important that applicants understand the limitations of the FSTD in replicating the physiological and psychological aspects of upset recovery exercises.

Note: In order to avoid negative training and negative transfer of training, the ATO should ensure that the selected upset recovery exercises take into consideration the limitations of the FFS.

(b) Stall event recovery in FSTD (Appendix 9, Section B(5) exercise 7.2.1; Section B(6) exercise 3.7.1)

(1) It is of utmost importance that stall event recovery training takes into account the capabilities of the FFS used. To deliver stall event recovery training, the FFS should be qualified against the relevant UPRT elements of CS-FSTD Issue 2. Stall event recovery training should include training up to the stall (approach-to-stall). Post-stall training may be delivered provided the device has been qualified against the relevant optional elements of CS-FSTD Issue 2 and the operator demonstrates that negative training or negative transfer of training is avoided. A 'stall event' is defined as an occurrence whereby the aeroplane experiences one or more conditions associated with an approach-to-stall or a post stall.

(2) Stall event recovery training should emphasise the requirement to reduce the AoA whilst accepting the resulting altitude loss. High-altitude stall event training should be included so that flight crew experience the aeroplane control response, the significant altitude loss during

the recovery, and the increased time required to recover. The training should also emphasise the risk of triggering a secondary stall event during the recovery.

(3) Recovery from a stall event should always be conducted in accordance with the stall event recovery procedures of the OEMs.

Note: If an OEM-approved recovery procedure does not exist, ATOs should develop and train the aeroplane-specific stall recovery procedure based on the template in Table 1 below. Refer to Revision 3 of the Airplane Upset Prevention and Recovery Training Aid (AUPRTA) for a detailed explanation and rationale of the stall event recovery template as recommended by the OEMs.

Table 1: Recommended stall event recovery template

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

(c) Nose-high and nose-low recovery exercises (Appendix 9, Section B(5) exercise 7.2.2; B(6) exercise 3.7.2)

Nose-high and nose-low recovery exercises should be conducted in accordance with the strategies recommended by the OEMs contained in Tables 2 and 3 below.

Note: As the OEM procedures always take precedence over the recommendations, ATOs should consult the OEM on whether any approved type-specific recovery procedures are available prior to using the templates.

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

Table 2: Recommended nose-high recovery strategy template

Nose-high recovery strategy template		
Either pilot — Recognise and confirm the developing situation by announcing **'nose high'**		
PF		**PM**
1.	**AUTOPILOT — DISCONNECT** (A large out-of-trim condition could be encountered when the autopilot is disconnected)	**MONITOR** airspeed and attitude throughout the recovery and **ANNOUNCE** any continued divergence
2.	**AUTOTHRUST/AUTOTHROTTLE — OFF**	
3.	APPLY as much nose-down control input as required to obtain a nose-down pitch rate	
4.	**THRUST — ADJUST** (if required) (Thrust reduction for aeroplanes with underwing-mounted engines may be needed)	
5.	**ROLL — ADJUST** (if required) (Avoid exceeding 60-degree bank)	
6.	When airspeed is sufficiently increasing — **RECOVER** to level flight (Avoid the secondary stall due to premature recovery or excessive G-loading)	
NOTE: (1) Recovery to level flight may require use of pitch trim. (2) If necessary, consider reducing thrust in aeroplanes with underwing-mounted engines to aid in achieving nose-down pitch rate. (3) **WARNING**: Excessive use of pitch trim or rudder may aggravate the upset situation or may result in high structural loads.		

Table 3: Recommended nose-low recovery strategy template

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

(d) Go-around with all engines operating from various stages during an instrument approach (Appendix 9, Section B(5) exercise 7.3; B(6) exercise 4.1.)

(1) The objective of the go-around exercises is to expose the student pilot to the physiological effects caused by a go-around. The instructor should ensure that student pilots understand

the objective of the exercises and provide students with appropriate coping strategies, including TEM. Due consideration should be given to environmental conditions when evaluating the demonstration of task proficiency and related criteria.

(2) A go-around may be commenced at any time during an approach, including before the aeroplane is in the landing configuration. Historically, most go-around training has been conducted when the aeroplane is in the landing configuration prior to commencing the go-around. Students must be prepared to adapt the go-around manoeuvre if the go-around is commenced prior to the point where the aeroplane is fully configured for landing. Situation awareness in relation to flap and gear configuration, aeroplane speed and missed approach altitude is important.

(3) Unanticipated go-arounds may startle the students (e.g. unexpected ATC constraints, automation malfunction, adverse weather, etc.). Students may find themselves faced with a situation where they have to perform a large number of critical actions under a high workload (e.g. setting thrust, landing gear retraction, flight path management). The instructor should explain that there is also a possibility of disorientation during a go-around because of the somatogravic effect produced by large longitudinal acceleration felt by the inner-ear as the aeroplane speed increases. This effect cannot be reproduced in an FSTD.

(4) It is vital that the correct pitch attitude is selected and maintained, while the aeroplane is kept in trim as it accelerates (depending on the aeroplane type). On some aeroplane types with under-slung engines the pitch response with all engines functioning may be amplified due to the relatively low gross weight towards the end of a flight and the high thrust available from modern aeroplane engines. It is particularly important that trim changes are anticipated on such aeroplanes.

(5) ATOs should develop scenarios for go-around training containing different take-off and approach stall situations that also involve surprise and startle effects and include:

(i) a go-around from the non-landing configuration;

(ii) a go-around at low gross weight using maximum go-around thrust;

(iii) a go-around from the outer marker or equivalent point;

(iv) a go-around below 500 ft using, as applicable/permitted, reduced go-around thrust;

(v) a go-around initiated above the published missed approach altitude; and

(vi) a normal go-around from the landing configuration using reduced go-around thrust (if available / type-specific).

(6) Training should also incorporate topics such as flight path management (manual and automatic), application of procedures, startle factors, communication, workload management and situation awareness. The objective of this training is to highlight:

(i) differences to procedures when the aircraft is in the non-landing configuration;

(ii) differences in handling characteristics at low gross weights and high thrust settings;

(iii) the threat associated with go-arounds close to the published missed approach altitudes;

(iv) startle and surprise associated with an unplanned go-around (ATC, blocked runway, etc.);

(v) the importance of effective communication between flight crew;

(vi) the requirement to be aware of the aircraft energy state during a go-around; and

(vii) the importance of engaging the autopilot or flight director in the correct modes during a go-around.

(7) Go-around training should not be limited to addressing the somatogravic effects caused by a go-around. Training should also cover topics such as flight path management (manual and automatic), application of procedures, startle factor, communication, workload management and situation awareness. Flight path management training should address:

(i) the handling differences of a lighter than normal aircraft which may differ to handling experienced during take-off when the aircraft is much heavier;

(ii) the different reaction of the aeroplane (pitch and vertical speed) comparing a go-around performed with reduced G/A thrust (if the function is available) and a go-around performed with full G/A thrust (a different weight).

(8) The importance of correct selection of TO/GA modes by the PF should also be emphasised (pushing TO/GA, selected the correct thrust lever detent, etc.)

(9) The importance of the PM role in the go-around manoeuvre should also be highlighted. The PM usually has higher workload as they need to reconfigure the aircraft, engage FMA modes, communicate with ATC and monitor the actions of the PF. This excessive workload for the PM may lead him or her to prioritise actions to the detriment of monitoring activities. The phenomenon of attentional tunnelling may also need to be addressed. This happens when one pilot, or both, focus exclusively on a problem at the expense of general monitoring of the flight parameters.

END

Affected Pages from Last Update

#	Page	Amendmant
1.	8	[TABLE] 4 July 2023 NPA 2023-07 (In Synch with EASA)
2.	12	GNSS Global Navigation Satellite Systems
3.	13	LIFUS Line Flying Under Supervision
4.	15	UPRT Upset Prevention and Recovery Training
5.	279	RENEWAL OF INSTRUMENT RATING AT AN APPROVED TRAINING ORGANISATION (ATO): REFRESHER TRAINING~~Renewal of instrument rating: refresher training~~
6.	279	The objective of the refresher training at an ATO is to reach the level of proficiency needed to pass the instrument rating proficiency check, as described in Appendix 9, or the instrument rating skill test as described in Appendix 7 to Part-FCL, as applicable. The amount of refresher training needed should be determined by the ATO on a case-by-case basis, taking into account the following factors:
7.	279	the experience of the applicant;
8.	279	the amount of time elapsed since the privileges of the rating were last used;
9.	279	the complexity of the aircraft;
10.	279	whether the applicant has a current rating on another aircraft type or class; and
11.	280	where considered necessary, the performance of the applicant during a simulated proficiency check for the rating in a flight simulation training device (FSTD) or an aircraft of a relevant type or class.
12.	280	The amount of training needed to reach the desired level of competency should increase with the time elapsed since the privileges of the rating were last used.
13.	280	Once the ATO has determined the needs of the applicant, it should develop an individual training programme based on the ATO's approved course for the rating and focusing on those aspects where the applicant has shown the greatest needs. Theoretical-knowledge instruction should be included, as necessary. The performance of the applicant should be reviewed during the training, and additional instruction should be provided where necessary to reach the standard required for the proficiency check.
14.	280	After successful completion of the training, the ATO should provide a training completion certificate to the applicant, which describes the evaluation of the factors listed under (a) above and the training received, and includes a statement that the training has been successfully completed. The training completion certificate should be presented to the examiner prior to the proficiency check. Following the successful renewal of the rating, the training completion certificate and examiner report form should be submitted to Kuwait DGCA.
15.	280	Taking into account the factors listed in (a) above, an ATO may also decide that the applicant already possesses the required level of proficiency and that no refresher training is necessary. In such a case, the certificate or other documental evidence referred to in point (c) above should contain a respective statement including sufficient reasoning.~~Paragraph (c)(1) of FCL.625 determines that if the instrument rating has lapsed, the applicant shall go through refresher training at an ATO, to reach the level of proficiency needed to pass the instrument element of the skill test prescribed in Appendix 9 to Part- FCL. The refresher training needed should include theoretical and practical training. The amount of refresher training needed should be determined on a case-by-case basis by the ATO, taking into account the following factors:~~ ~~the experience of the applicant. To determine this, the ATO should evaluate the pilot's log book, and, if necessary, conduct a test in an FSTD.~~ ~~the amount of time lapsed since the expiry of the validity period of the rating. The amount of training needed to reach the desired level of proficiency should increase with the time lapsed. In some cases, after evaluating the pilot, and when the time lapsed is very limited (less than 3 months), the ATO may even determine that no further refresher training is necessary. The following may be taken as guidance when determining the needs of the applicant:~~ ~~expiry for a period shorter than 3 months: no supplementary requirements;~~ ~~expiry for longer than 3 months but shorter than 1 year: a minimum of one training session;~~ ~~expiry for longer than 1 year but shorter than 7 years: a minimum of three training sessions;~~ ~~expiry for longer than 7 years: the applicant should undergo the full training course for the issue of the IR.~~ ~~Once the ATO has determined the needs of the applicant, it should develop an individual training programme, which should be based on the initial training for the issue of instrument ratings and focus on the aspects where the applicant has shown the greatest needs.~~

#	Page	Amendmant
		~~After successful completion of the training, the ATO should give a certificate to the applicant, to be submitted to the~~ [Company] ~~when applying for the renewal.~~ Subpart H - Class and Type Ratings
16.	358	[TABLE] (a) ensures adequate facilities; (b) prepares briefing material; (a) understand objectives; (b) available tools; (a)makes TEM or CRM links with technical training. (b) for aeroplanes: makes upset prevention links with technical training. (a) HF, TEM or CRM. (b) Causes and countermeasures against undesired aircraft states
17.	460	GM1 FCL.905.TRI(b) Privileges and conditions
18.	460	INSTRUCTORS INSTRUCTING FOR THE ISSUE OF A TRI OR SFI CERTIFICATE
19.	460	Training in an aeroplane is not a requirement for the issue of an SFI or a TRI certificate. In order to deliver effective UPRT, it is beneficial for the instructor to have first-hand experience of the critical psychological and physiological human factors, which might be present during recoveries from developed upsets. These human factors (effects of unusual acceleration, such as variations from normal 1G flight, the difficulty to perform counter-intuitive actions, and the management of the associated stress response) can only be experienced during training in an aeroplane because FFSs are not capable of reproducing sustained accelerations. Completion of the advanced UPRT course in accordance with FCL.745.A would provide such experience and is therefore useful for instructors providing instruction for the issue of a TRI or an SFI certificate.
20.	460	GM1 FCL.910.TRI(b)(2) TRI training for type extension
21.	460	'Relevant parts of the technical training and the flight instruction parts of the applicable TRI training course' means that the training should be relevant to its purpose, taking into consideration the experience of the individual TRI on other aircraft types that are similar to the one for which the extension of TRI privileges is applied for.
22.	473	Specific trainings: LIFUS training and landing training
23.	473	The applicant for a TRI(A) certificate should receive instruction in an FSTD in accordance with FCL.930.TRI(a)(4).
24.	473	(1) LIFUS training: content
25.	473	Training in an FSTD:
26.	474	(1) familiarisation as PF on both seats, as applicable, which should include at least the following:
27.	474	pre-flight preparation and use of checklists;
28.	474	taxiing;
29.	474	take-off;
30.	474	rejected take-off;
31.	474	engine failure during take-off, after take-off decision speed (V1);
32.	474	one-engine-inoperative approach and go-around;
33.	474	one-engine-inoperative (critical, simulated) landing;
34.	474	other emergency and abnormal operating procedures (as necessary);
35.	474	emergency evacuations; and
36.	474	task sharing and decision-making; and
37.	474	(2) aeroplane training techniques:
38.	474	methods of providing appropriate commentary; and
39.	474	intervention strategies developed from situations that are role-played by a TRI training course instructor, taken from but not limited to:
40.	474	take-off:

#	Page	Amendmant
41.	474	— tail strike awareness and avoidance,
42.	474	— rejected take-off,
43.	474	— actual engine failure,
44.	474	— take-off configuration warning, and
45.	474	— overcontrolling;
46.	474	approach and landing:
47.	474	— normal approach,
48.	474	— high flare, long float, no flare,
49.	474	— immediate go-around after touchdown,
50.	474	— baulked landing,
51.	474	— rejected landing,
52.	474	— crosswind, and
53.	474	— overcontrolling; and
54.	474	flight management:
55.	474	— task sharing and handover of controls,
56.	474	— effect of ATC-delaying actions on endurance,
57.	474	— alternate management and diversion, and
58.	474	— traffic awareness when flying in pattern
59.	474	Training in aeroplane (in flight)
60.	474	This training should consist of at least one route sector where the candidate instructor:
61.	474	either observes a TRI(A) who conducts line flying under supervision, or
62.	474	conducts role play line flying under supervision for a TRI(A) who is qualified for line flying under supervision.
63.	474	Upon completion of the above-mentioned training, the candidate instructor should complete a route sector under the supervision and to the satisfaction of a TRI(A) who is nominated for that purpose by the ATO.
64.	474	(2) Landing training: content
65.	474	Training in an FSTD
66.	474	The training in an FSTD should be tailored and appropriate to the aeroplane type, and the exercises should be more demanding for each candidate instructor. In addition to the LIFUS training items in the FSTD (listed under (a)(1) and (a)(2) above), the landing training should comprise a variety of exercises that cover both normal and abnormal operations including the following:
67.	475	(1) consideration of threats during touch-and-go:
68.	475	operating at low altitude;
69.	475	General Aviation (GA) traffic;
70.	475	increased fuel consumption;
71.	475	bird strikes;
72.	475	decision to continue touch-and-go or make a full-stop landing; and
73.	475	aspects of performance and associated risks;
74.	475	(2) incorrect rudder inputs;
75.	475	(3) failure of a critical engine;
76.	475	(4) approach and full-stop landing in simulated engine-out flight; and
77.	475	(5) go-around in simulated engine-out flight. The applicant needs to be additionally trained in other abnormal items during the training course, if required.
78.	475	Training in an aeroplane

#	Page	Amendmant
79.	475	Upon completion of the FSTD training, the applicant should perform role-play flying for landing training under the supervision and to the satisfaction of a TRI(A) who is nominated for that purpose by the ATO.
80.	475	The training should cover at least the following elements:
81.	475	take-off,
82.	475	traffic pattern,
83.	475	touch-and-go,
84.	475	go-around, and
85.	475	full-stop landing with different flap settings.
86.	475	In exceptional circumstances, it may be necessary to perform simulated engine-out handling and engine-out operations in an aeroplane in addition to representative exercises from the type rating course.
87.	475	UPRT
88.	475	Instructors should have the specific competence to provide UPRT during the type rating training course, including the ability to demonstrate knowledge and understanding of the type-specific upset recovery procedures and of the recommendations that are developed by the original equipment manufacturers (OEMs). Therefore, during the TRI training course, the student instructor should:
89.	475	be able to apply the correct upset recovery techniques for the specific aeroplane type;
90.	475	understand the importance of applying type-specific OEM procedures for recovery manoeuvres;
91.	475	be able to distinguish between the applicable SOPs and OEM recommendations (if available);
92.	475	understand the capabilities and limitations of the FSTDs that are used for UPRT;
93.	475	ensure that the training remains within the FSTD training envelope to avoid the risk of negative transfer of training;
94.	475	understand and be able to use the IOS of the FSTD in the context of providing effective UPRT;
95.	475	understand and be able to use the available FSTD instructor tools to provide accurate feedback on pilot performance;
96.	475	understand the importance of adhering to the FSTD UPRT scenarios that are validated by the training programme developer; and
97.	475	understand the missing critical human factor aspects due to the limitations of the FSTD, and convey this to the student pilot(s) receiving the training.
98.	504	EXERCISE 6: UPRT
99.	504	Instructors should have the specific competence to provide UPRT during the type rating course, including the ability to demonstrate knowledge and understanding of the type-specific upset recovery procedures and of the recommendations that are developed by the OEMs. Therefore, during the CRI training course, the student instructor should:
10(	504	be able to apply the correct upset recovery techniques for the specific aeroplane type;
10:	504	understand the importance of applying type-specific OEM procedures for recovery manoeuvres;
10:	504	be able to distinguish between the applicable SOPs and OEM recommendations (if available);
10:	504	understand the capabilities and limitations of the FSTDs that are used for UPRT;
10-	504	ensure that the training remains within the FSTD training envelope to avoid the risk of negative transfer of training;
10:	504	understand and be able to use the IOS of the FSTD in the context of providing effective UPRT;
10(	504	understand and be able to use the available FSTD instructor tools to provide accurate feedback on pilot performance;
10'	504	understand the importance of adhering to the FSTD UPRT scenarios that are validated by the training programme developer; and
10:	504	understand the missing critical human factor aspects due to the limitations of the FSTD, and convey this to the student pilot(s) receiving the training.

#	Page	Amendmant
10	550	The UPRT elements and components specified in AMC2 to Appendix 3; AMC1 to Appendix 5 point (a) should be integrated into the flying training phases or modules.
11	550	The flight instruction syllabus should take into account the principles of TEM.
11	551	the basic UPRT exercises as specified in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5~~flight at critically low air speeds, recognition of recovery from incipient and full stalls, spin avoidance~~;
11	552	in-flight manoeuvres and specific flight characteristics and the basic UPRT exercises as specified in Sections A, B, C and D of Table 2 in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5;
11	552	phase 5: Advanced UPRT in accordance with point FCL.745.A;
11	552	phase 6:
11	554	the basic UPRT exercises as specified in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5~~flight at critically low air speeds, recognition of and recovery from incipient and full stalls, spin avoidance~~;
11	555	in-flight manoeuvres and particular flight characteristics and the basic UPRT exercises as specified in Sections A, B, C and D of Table 2 in paragraph (b) of AMC2 to Appendix 3; AMC1 to Appendix 5;~~:~~
11	555	the basic UPRT exercises as specified in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5;~~flight at relatively slow air speeds, recognition of and recovery from incipient and full stalls, spin avoidance;~~
11	556	in-flight manoeuvres and particular flight characteristics including the basic UPRT exercises as specified in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5~~in-flight manoeuvres and particular flight characteristics~~;
11	558	This module is identical to the 10 hours basic instrument flight module as set out in AMC2 to Appendix 6. This module is focused on the basics of flying by sole reference to instruments, including limited panel and basic UPRT exercises as specified in Sections A, B and C of Table 2 in point (b) of AMC2 Appendix 3; AMC1 Appendix 5.~~unusual attitudes.~~
12	559	Basic UPRT exercises as specified in point (b) of AMC2 to Appendix 3;
12	559	AMC1 to Appendix 5, excluding those manoeuvres which have already been
12	559	completed during exercises 15 and 16~~Recognition of, and recovery from, incipient and full stalls.~~