European Aviation Safety Agency

Notice of Proposed Amendment 2016-14

Easier access for general aviation pilots to instrument flight rules flying

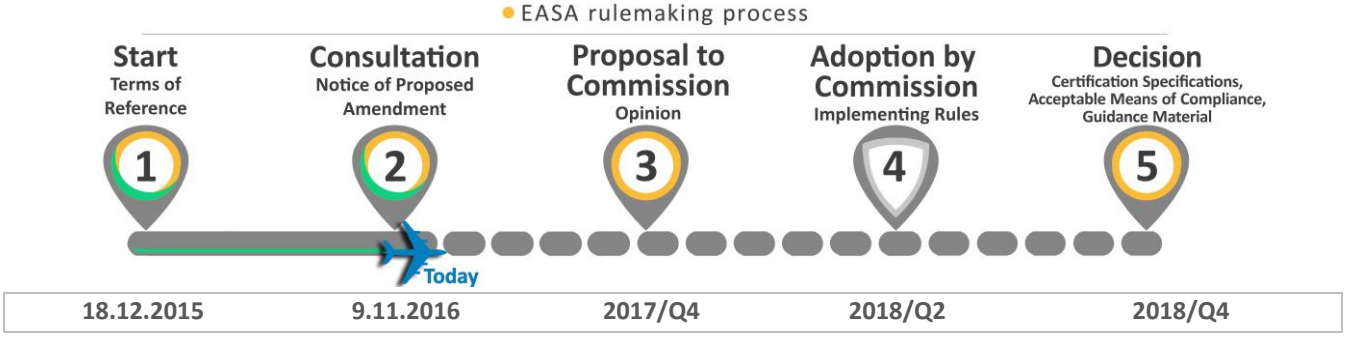
RMT.0677 — 9.11.2016

EXECUTIVE SUMMARY

This Notice of Proposed Amendment (NPA) aims for simpler, lighter and better rules for general aviation (GA) regarding flights under instrument flight rules (IFR). During the 2014 EASA Safety Conference on General Aviation, the topic of 'easier access of GA pilots to IFR flying' was identified by the GA community as a high-priority measure that will improve the safety and utility of GA flying.

Specifically, this NPA proposes a more proportionate set of requirements for GA pilots to gain an IFR flying qualification. This is one of the key initiatives for meeting the EASA and GA community's objectives in this area.

Action area:	General aviation				
Affected rules:	Commission Regulation (EU) No 1178/2011; Decision No 2011/016/R				
Affected stakeholders:	GA community; GA pilots; instructors; examiners; training organisations				
Driver:	Efficiency/proportionality		**Reference:**	Regulation (EC) No 216/2008; General Aviation Road Map	
Rulemaking group:	No, task force	**Impact assessment:**	Light	**Procedure:**	Standard



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1. Procedural information

1.1. The rule development procedure

The European Aviation Safety Agency (hereinafter referred to as the 'Agency') developed this NPA in line with Regulation (EC) No 216/2008[1] (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure[2].

This rulemaking activity is included in the Agency's 2016–2020 Rulemaking Programme under RMT.0677.

The related Terms of Reference, Issue 2, were published together with the Concept Paper 'Easier access for General Aviation (GA) pilots to instrument flight rules (IFR) flying' on the Agency's website on 18 December 2015[3].

The text of this NPA has been developed by the Agency with the support of the 'GA IFR flying Task Force' (TF). The TF comprised experts from national aviation authorities (NAAs) and the GA community, namely experts from the French DGAC, the UK CAA, the Swedish CAA, the Austrian CAA (Austro Control) and the GA community (Europe Air Sports (EAS), European Regional Aerodromes Community (ERAC) and International Aircraft Owners and Pilots Association (Europe) (IAOPA Europe)). It is hereby submitted to all interested parties for consultation[4].

1.2. The structure of this NPA

Chapter 1 of this NPA contains the procedural information related to this task. Chapter 2 (Explanatory Note) explains the core technical content. Chapter 3 contains the proposed text for the new requirements.

1.3. How to comment on this NPA

Please submit your comments using the automated **Comment-Response Tool (CRT)** available at **http://hub.easa.europa.eu/crt/**[5].

The deadline for submission of comments is **31 January 2017.**

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1 Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1).

2 The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as the 'Rulemaking Procedure'. See Management Board Decision concerning the procedure to be applied by the Agency for the issuing of Opinions, Certification Specifications and Guidance Material (Rulemaking Procedure), EASA MB Decision No 18-2015 of 15 December 2015.

3 See http://www.easa.europa.eu/system/files/dfu/ToR%20(%2B%20Concept%20Paper)%20RMT.0677%20Issue%202.pdf.

4 In accordance with Article 52 of the Basic Regulation and Articles 6(3) and 7 of the Rulemaking Procedure.

5 In case of technical problems, please contact the CRT webmaster (crt@easa.europa.eu).

6 Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 311, 25.11.2011, p. 1).

1.4. The next steps in the procedure

The Agency will publish the related comment-response document (CRD) concurrently with the related Opinion, whose publication is planned for 2017/Q4.

Said Opinion, based on the content of this NPA and the outcome of the public consultation, will contain the proposed amendments to Commission Regulation (EU) No 1178/2011[6] (hereafter referred to as the 'Aircrew Regulation'), in particular amendments to its Annex I (Part-FCL), and will be addressed to the European Commission which shall use it as a technical basis in order to prepare an EU regulation amending the Aircrew Regulation. Following the adoption of this regulation, the Agency will issue a Decision containing the related acceptable means of compliance (AMC)/guidance material (GM).

[6] Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 311, 25.11.2011, p. 1).

2. Explanatory Note

2.1. Overview of the issues to be addressed

The goal of the Agency's General Aviation Road Map is to work towards simpler, lighter and better rules for GA. During the 2014 EASA Safety Conference on General Aviation, the topic of 'easier access of GA pilots to IFR flying' was identified by the GA community as an important initiative to improve the safety and utility of GA flying. This was in response to the safety concerns and the views of the GA community that the current regulatory regime for many aspects of IFR flying should be made more proportionate.

Historically, the level of GA IFR flying activity in Europe has been low compared to that in the USA. While this disparity can to some extent be explained by factors unrelated to the regulatory regime, there is some evidence suggesting that amending the relevant European regulations may facilitate growth in this area.

With better access to IFR flying, GA pilots would be able to plan A-B flights with more confidence of safe completion. They would be less vulnerable to changing weather conditions and the associated risk of continuous visual flight rules (VFR) flights into instrument meteorological conditions (IMC). As well as increasing the safety and resilience of GA flying, it will also reduce the complexity of longer flights, which often require extensive planning and contingency provisions to be executed under VFR. IFR flight planning for longer A-B flights is often more straightforward — thus encouraging pilots to conduct flights that they might otherwise have not attempted. This will bring safety and economic benefits.

To progress the issue, the Agency established a TF (as described in 1.1.), whose objective is to support the Agency in this rulemaking task. The role, responsibilities and duties of the TF are to:

— create common understanding of the multifaceted issues hindering GA pilot access to IRF flying;

— find optimal solutions to the complex issues through collaborative efforts across fields; and

— assist the Agency in the development of the draft regulatory deliverables and regulatory requirements.

It was recognised at an early stage that a holistic approach to the issue is required — improvements as regards GA IFR flying must be targeted across the different regulatory domains. In view of this, one of the deliverables of the TF was a comprehensive action plan that would address relevant cross-functional issues in this area. After an initial review, the TF drafted a new ToR (Issue 2) together with a Concept Paper (published on 18 December 2015), with the aim to address the different issues that have been identified for improvement or resolution. This included discussions on the following:

— more proportionate flight crew licensing (FCL) requirements;

— IFR procedures at aerodromes;

— air traffic management (ATM) more compatible with GA flight profiles; and

— the certification of aircraft and equipment used for IFR flying.

Due to time constraints and the need for prioritisation of actions, the TF will address aircrew issues first. Further tasks will be planned in the other domains upon delivery of a comprehensive action plan,

as mentioned in the ToR, as one of the deliverables of this rulemaking task. In this context, it is expected that the comprehensive action plan will contain recommendations for amendments to the aircrew, airworthiness, ATM, and aerodrome requirements.

2.2. Objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in Chapter 2 of this NPA.

The general objectives of the European Union in the field of civil aviation are defined in Article 2 of the Basic Regulation. The European General Aviation Safety Strategy[7], adopted by the EASA Management Board in 2012, identifies the key rationales that render it necessary to adopt a new specific approach for GA. This new approach is seen by the GA community as an urgent necessity in order to ensure a sustainable development of the sector in Europe.

The TF's remit is to make proposals across the different regulatory domains. However, the specific objective of the proposal set out in this NPA is to create a more proportionate training path for GA pilots to gain an instrument flying qualification. This is with the primary objective of encouraging more GA pilots to conduct safe A-B flights under IFR.

Development of the rating required consideration of:

— GA pilot competencies required for IFR flying;

— training structure to achieve these competencies;

— appropriate privileges, depending on the competencies gained;

— appropriate theoretical knowledge training;

— associated requirements for instructors and training organisations; and

— relationship with current FCL provisions in the Aircrew Regulation.

The overall objective of this NPA is to reflect on the principles of a proportionate and competency-based approach throughout the different regulatory domains, so as to address the needs of GA pilots as much as possible.

2.3. Summary of the regulatory impact assessment (RIA)

2.3.1. Questionnaire

In order to better understand some of the current barriers for GA pilots to gain IFR flying qualifications, a questionnaire has been addressed to the EASA Member States. The results are presented on the next page.

[7] https://www.easa.europa.eu/system/files/dfu/European%20GA%20Safety%20Strategy.pdf

Table 1: Number of replies to the RMT.0677 IFR questionnaire per EASA Member State

Country	Number of replies	Share in total
United Kingdom	486	53.7%
Germany	108	11.9%
Sweden	55	6.1%
Czech Republic	48	5.3%
Poland	31	3.4%
Finland	29	3.2%
Luxembourg	26	2.9%
Switzerland	20	2.2%
Norway	20	2.2%
Denmark	15	1.7%
France	12	1.3%
Netherlands	12	1.3%
Belgium	9	1.0%
Ireland	8	0.9%
Slovak Republic	6	0.7%
Spain	5	0.6%
Croatia	4	0.4%
Other	3	0.3%
Italy	3	0.3%
Cyprus	1	0.1%
Iceland	1	0.1%
Hungary	1	0.1%
Greece	1	0.1%
Slovenia	1	0.1%
Total	905	100%

Figure 1: Number of replies by EASA Member States

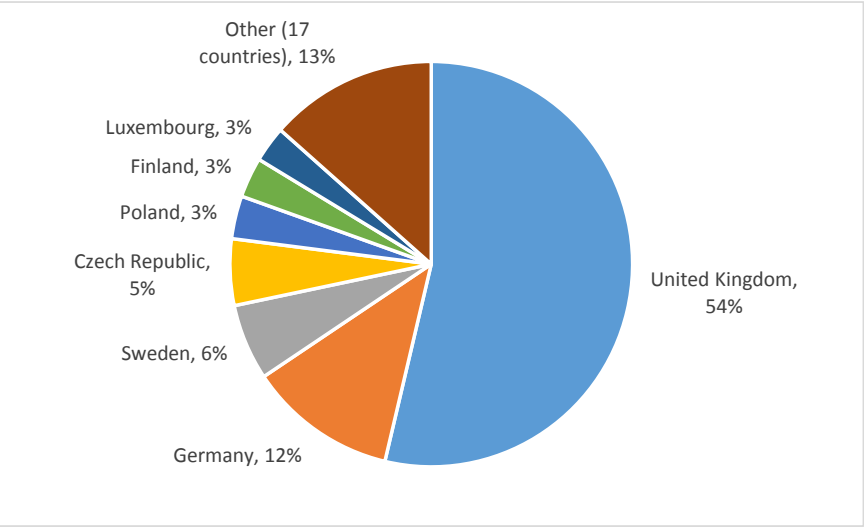

Table 2: Number of pilot licences among respondents[8]

Type	Number of licence
PPL	668
CPL	201
ATPL	82

Type	Number of respondents	Share in total
PPL	614	70%
CPL	181	21%
ATPL	82	9%

Table 3: Share of IR holders by licence type

Highest level of licence	Holds an IR rating	
	Yes	No
PPL	56%	44%
CPL	89%	11%
ATPL	84%	16%

Table 4: IR training courses followed by respondents

Type of rating	Before 8/Apr/2013	From 8/Apr/2013	Total
IR	180	61	241
EIR	5	4	9
3rd country IR	77	11	88
National IR	228	34	262
Total	490	110	600

[8] Since one respondent might hold more than one licence, the number of licences is higher than the number of respondents.

Table 5: IR trainings that PPL holders currently follow

Training followed	Count	Share
IR	26	52%
EIR	15	30%
National IR (non-EASA licence)	6	12%
Third country IR	3	6%
Total	50	100%

Table 6: Reasons for not getting a pilot licence

Reasons for not getting an IR	Count	Share
Too expensive	24	57%
Too time-consuming	12	29%
No training courses nearby	6	14%
Total	42	100%

Table 7: Reasons for not getting an instructor privileges for IR

Reasons for lack of IR rating	Count	Share
Too expensive	93	39%
Too time-consuming	73	31%
No instructor training courses nearby	26	11%
Pre-requisite too demanding	47	20%
Total	239	100%

Table 8: Reasons for not getting examiner privileges for IR

Reasons for lack of examiner privileges for IR	Count	Share
Too expensive	144	41%
Too time-consuming	105	30%
No examiner training courses nearby	53	15%
Pre-requisite too demanding	51	14%
Total	353	100%

2.3.2. Analysis

According to the results of the questionnaire, the main reasons pilots do not complete IFR flying qualifications are that they are too expensive or too time-consuming to obtain. While there will always be a cost barrier associated with learning to fly under IFR, this emphasises the need to make it as proportionate and flexible as possible.

2.3.3. Policy options

Table 1: Selected policy options

Option	Description
0	**'Do nothing'**: No change to the rules; risks remain as outlined in the issue analysis.
1	**'Amend CB-IR'**: Amend the competency-based instrument rating (CB-IR) to be more proportionate, for example closer to the requirements for the FAA-IR. This would probably not mean significant changes to the flight training requirements, the focus would be on reducing the amount of theoretical knowledge.
2	**'Adapt sub-ICAO instrument qualification'**: Adapt an existing 'sub-ICAO' instrument qualification to the EASA system. Take an existing 'sub-ICAO' instrument flying qualification that is currently or has been issued by another State (for example, the UK IR (Restricted)), and modify it for inclusion in the EASA system.
3	**'Introduce a new BIR'**: Develop a new instrument qualification, i.e. 'basic instrument rating' (BIR), more tailored to the needs of GA pilots and the European flying environment. This would involve the creation of a new qualification that is not necessarily compliant with the ICAO hours requirements (less time, for example, than for CB-IR), but still provides for good utility and safety for GA pilots to fly under IFR in Europe. The training would be as modular and competency-based as possible.
4	***'Aeroplane cloud flying rating'**: As part of the TF discussions, a fourth supplementary option was considered, that would facilitate some of the safety improvement aims in the area of flight in IMC. This would be a more basic qualification to allow cloud penetration, similar to the cloud flying rating for sailplanes.* *It was decided during the TF discussions that the focus of this NPA should be on encouraging planned IFR flights — so, while it was unanimously agreed that the idea has merit, it was decided to refer the proposal to RMT.0678 for further consideration.* *It is, therefore, not included in the options part of the RIA, but is further discussed in Section 2.5. 'Aeroplane cloud flying rating'.*

The table on the next page summarises the current instrument rating qualifications opportunities in the EASA Member States and in the United States, including the most important privileges and requirements.

	Modular -IR (FCL.600 & Appendix 6 A)	CB –IR (FCL.600 & Appendix 6 Aa)	En-route IR (FCL.825)	FAA Part- 61 IR	UK IMC rating
Applicability since	JAR-FCL	8 April 2014	8 April 2014	N/A	Prior JAR-FCL
Language	English mandatory				
Medical	At least class 2 + pure tone audiometry examinations based on class 1 requirements (+ colour safe).			At least class 3	At least class 2
Privileges	Full IR	Full IR, except HPCA	En-route IFR only.	Full IR	Approaches in IFR only
Prerequisites	PPL(A) / CPL(A). 50 hrs of cross-country flight time as PIC in aeroplanes		PPL(A) 20 hours of cross-country flight time as PIC in aeroplanes.	50h of cross country as a PIC; 10h of which must be in aeroplane.	PPL(A) 25hrs, including 10 hrs PIC and 5 hrs cross-country
Prerequisites - ratings	For PPL night rating only required when privileges to fly IFR by night are sought.			night flying privileges in PPL	JAR Night rating
Theoretical Knowledge (TK) instruction	150 hrs, 7 subjects at ATO At least 10% at ATO, rest could be distance learning.	80hrs, 7 subjects at ATO. At least 10% at ATO, rest could be distance learning.		No minimum time TK instruction from an authorized instructor or home-study course	20 hrs
TK examination ECQB	7 exams MCQ 06hrs30min	7 exams MCQ 03hrs 50min		1 exam, 60 MCQ, 02hrs 30min	1 exam, 25 MCQ
Instrument flight instruction	SE - 50 hours. ME - 55 hours	SE - 40 hours. ME - 45 hours	SE - 15 hrs ME - 16hrs (of which 4hrs ME)	SE - 40 hours. ME - 45 hours	SE&ME - 15 hours
Instrument flight Examination	Skill test (in rule)	Skill test (in rule)	Skill test (in AMC)	Skill test (in PTS)	Skill test (UK CAA)
Prior experience crediting	holder of IR(H) reduced by 10 hrs.	30 hrs prior flight time under IFR as PIC on aeroplanes Full training course credit for holders of Part-FCL PPL or CPL and IR(A)issued in accordance with an ICAO Annex I	5hrs (6 hrs ME) credit training outside ATO Full training course credit for holders of Part-FCL PPL or CPL and IR(A)issued in accordance with an ICAO Annex I	N/A	None
Validity	12 months	12 months	12 months	No validity	25 months
Revalidation	Prof. check	Prof. check	Prof. Check or 6hrs PIC under IFR and training flight of at least 1 hour with a qualified instructor. Each alternate revalidation Prof Check.	Currency requirements, within the last 6 months 6 Instrument approaches, another 6 months to meet the currency with a safety pilot. After 12 months: an instrument proficiency check (IPC) Currency	Under supervision of instructor completed a let-down, recognised approach to DH/MDH and Missed approach prior to test flight and revalidation test flight. >5 years – 7.5 hrs dual instruction and skill test
Renewal	Refresher training at ATO by qualified instructor and Prof Check. If >7 years - pass TK examinations again		Refresher training (outside ATO) by qualified instructor and Prof Check. If >7 years - pass TK examinations again		
Special conditions	Prof check must be done in either SE or ME depending on privileges sought.			test on a ME aeroplane gives privilege for the IR on SE aeroplanes	None Part-FCL Instructors and examiners. UK airspace only.

2.3.4. Safety impact

Option 0 'Do nothing'	No impact, safety level is maintained. The amended Aircrew Regulation (by Commission Regulation (EU) No 245/2014[9]) already enables more flexible training for the EASA instrument rating via the competency-based route.
Option 1 'Amended CB-IR'	Some positive impact on safety. For example, due to more proportionate theoretical knowledge requirements, more GA pilots than before might take up the CB-IR. However, the requirements are more onerous than those of Option 3, so uptake is likely to be low.
Option 2 'Sub-ICAO IR'	Some positive impact on safety; however, the outcome may not be optimised for use in all EASA Member States.
Option 3 'New BIR'	Some positive impact on safety. By enabling more GA pilots to undertake instrument flight training, they will improve their skills and allow them to plan A-B flights with more confidence of safe completion. This will make them as well less vulnerable to risks associated with flight in poor weather conditions, such as continuous VFR flight into IMC.

2.3.5. Social impact

Option 0 'Do nothing'	Status quo maintained. Potential market for GA IFR flying qualifications is not optimised, and compared to the United States, less GA pilots within the EASA Member States would hold instrument qualifications.
Option 1 'Amended CB-IR'	Some positive social impact, similar to that described for Option 3; however, may be to a lesser extent.
Option 2 'Sub-ICAO IR'	Some positive social impact. However, the outcome would not be optimised across EASA Member States. Lesser positive impact than that of Option 3.
Option 3 'New BIR'	The introduction of more proportionate requirements, like the BIR, will encourage even more GA pilots to gain IFR flying qualifications and will provide for more flexibility for GA flying. GA flying is generally a recreational activity that individuals are conducting for enjoyment. Flight clubs and schools are places of social interaction, and flight training is an activity that involves learning new skills and gaining proficiency in a complex activity. It could, therefore, be considered to be of positive social impact. It also encourages travel and the free movement of people.

[9] Commission Regulation (EU) No 245/2014 of 13 March 2014 amending Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew (OJ L 74, 14.3.2014, p. 33).

2.3.6. Economic impact

Option 0 'Do nothing'	Due to the current situation, the relatively low number of GA pilots in Europe holding a qualification permitting them to fly under IFR will remain unchanged, and there will be no positive economic impact.
Option 1 'Amended CB-IR'	Some positive economic impact, similar to that described for Option 3; however, maybe to a lesser extent.
Option 2 'Sub-ICAO IR'	Some positive economic impact. However, the outcome would not be optimised across the EASA Member States. Lesser positive impact than Option 3.
Option 3 'New BIR'	The introduction of more proportionate requirements, like the BIR, will have a positive economic impact. Improved access to GA IFR flying will benefit GA pilots and organisations involved in their training, such as flight schools, clubs, and instructors. Organisations supporting the maintenance and operation of GA aircraft certified for IFR flight would also benefit, as would organisations involved in the manufacture of IFR-certified aircraft and the production of components and equipment for IFR flight.

2.3.7. General aviation and proportionality issues

Option 0 'Do nothing'	Will not bring about the changes requested by the GA Road Map, the Commission and the EASA Member States.
Option 1 'Amended CB-IR'	Will largely bring about the changes requested by the GA Road Map, the Commission and the EASA Member States.
Option 2 'Sub-ICAO IR'	Might achieve some of the stated aims of the GA Road Map; however, the result will not be optimised across the EASA Member States.
Option 3 'New BIR'	Will bring about the changes requested by the GA Road Map, the Commission and the EASA Member States, and as further explained in Section 2.1 of the Explanatory Note.

2.3.8. Impact on 'better regulation' and harmonisation

Option 0 'Do nothing'	Harmonisation is ensured. 'Better regulation' principles are not upheld as the current requirements are considered to be too burdensome for the GA pilot community.
Option 1 'Amended CB-IR'	Does not have an impact on EASA Member States' obligations towards ICAO. CB-IR would remain ICAO compliant. Also, it does not add to the complexity of Part-FCL.
Option 2 'Sub-ICAO IR'	Harmonisation would not be optimal, because the practical value of this option would vary between the different EASA Member States.
Option 3 'New BIR'	Rating may be obtained without full compliance with the ICAO instrument rating training requirements; however, this simply means the rating could not be used outside Europe. It does not have an impact on EASA Member States' obligations towards ICAO. While rating achieves proportionality for GA, it does introduce more complexity to the flight crew licensing requirements, because it is a new rating in addition to the existing ones in Part-FCL. Some feedback from stakeholders suggests that the number of instrument flying qualifications available is confusing — however, this could be mitigated by careful consideration of the integration of the new BIR into the existing FCL provisions.

2.3.9. Comparison and conclusion

Option 0 will have no impact on safety, but the relatively low number of GA pilots in Europe holding a qualification permitting them to fly under IFR will remain unchanged.

Option 1 and 2 will have a slightly positive safety, social and economic impact. More proportionate requirements, by amending the existing CB-IR or adapting the existing 'sub-ICAO' instrument qualifications, will encourage more GA pilots to complete IFR flying qualifications. However, the Agency believes that Option 1 may not achieve a proportionality benefit as great as that of Option 3, and Option 2 may suffer from the benefits not being optimised across all EASA Member States.

Option 3 will have the greatest positive safety, economic and social impact. By introducing the BIR, the number of GA pilots undertaking instrument flight training will likely increase the most, therefore all the benefits associated with increasing GA instrument flying in general would be maximised with this Option.

2.4. Overview of the proposed amendments

2.4.1. Principles of the proposal

Having decided on a course that reflects Option 3, supported by the EASA Safety Committee on 14 September 2016, the Agency determined the principles that should underpin the new IFR flying qualification. The target audience for the BIR will be pilots flying typical single- and multi-engine piston

GA aeroplanes for non-commercial operations. This is with the aim to encourage GA pilots to conduct A-B flights under IFR.

While the BIR may be issued before compliance with the ICAO Annex 1 is demonstrated, instrument flight time requirements are established in order to give maximum utility to GA pilots. These requirements will have similar privileges with the current Part-FCL IR, but more tailored to the needs of GA pilots and with certain limitations.

The key principles for the BIR are as follows:

— **Training that is entirely competency-based.** There will be no minimum hours requirement set for the BIR. Instead, the TF analysed all the required competencies that a GA pilot would need for an IFR flight, and grouped them into three modules of training. Candidates will progress to the next module or skill test when ready to do so.

— **Training that is flexible.** The core module of instrument flying skills must always be completed first, and after having done so, the candidate may choose which further module to tackle next, within a timescale that suits them. This takes into account the fact that GA pilots may often not have the time or financial resources to commit to a more conventional full course of training towards the IR.

— **Focus on the practical needs of GA pilots.** Holders of the BIR should feel confident to use it to the full extent of its privileges. While IFR flight has many safety advantages, central to its philosophy is to assess the risks of a particular flight in a more systematic way. To this end, the training will be focused on the real-world instrument flying needs of GA pilots, with particular emphasis on practical application of threat and error management. This will ensure that the full safety and utility benefits of IFR flight are reaped.

— **High standards of training and testing.** Despite the focus on GA needs, practical training and testing standards will be similar to those of the current Part-FCL CB-IR and EIR, particularly with regard to interaction with other airspace users. It is very important that GA pilots flying under IFR have the required competencies for this.

With the introduction of the BIR, the Agency is of the opinion that the current EIR might be redundant.

The Agency would like to ask its stakeholders for their feedback on the proposal to delete the EIR in FCL.825, together with its associated AMC and GM and the references to other requirements.

2.4.2. Training structure

Having decided that modular training is important, the Agency conducted a training needs analysis to establish the optimum content of the possible individual modules of training. This included identifying all competencies in existing instrument qualifications and determining how they could be logically ordered into a flexible and modular training system.

As a result of this, three modules were identified, with the idea being that **Module 1** is completed first, but the order in which Modules 2 and 3 are completed is up to the applicant:

— **Module 1** — this provides the foundation of instrument flying competencies. A course completion certificate will be issued after an acceptable standard has been reached and before the pilot is allowed to commence further training modules;

— **Module 2** — this will introduce 2D and 3D instrument approach procedures such as non-directional radio bacon (NDB), instrument landing system (ILS), performance-based navigation (PBN) (for example, global navigation satellite system (GNSS), etc.), standard instrument arrival (STAR), and standard instrument departure (SID); and

— **Module 3** — this will include en-route flight under IFR.

Each module contains the required individual competencies (laid down in the draft GM in this document). It will be up to the training organisation or instructor to determine whether the competencies have been assimilated to the required standard before progressing to the next module or skill test. This will allow candidates with a good aptitude to progress faster, while ensuring that slower-learning candidates progress only until they are ready. There is no proposal to have a particular expiry date for the successful completion of the different modules.

In order to give BIR holders confidence to use the BIR to the fullest extent, training and testing standards will be similar to those of the Part-FCL CB-IR and EIR — however, with emphasis on GA-specific areas.

2.4.3. Privileges and limitations

While the intention is to create a BIR that has similar practical value to the current Part-FCL CB-IR and EIR, it was decided that by having certain limitations, the practical training time and theoretical knowledge that candidates would need may be reduced, with very little loss of practical utility.

For example, it is relatively rare in typical GA operations to have to fly an instrument approach (particularly a 3D one) to absolute minima. Flying to low minima is quite a perishable skill, and one that would not necessarily be adequately maintained by the amount of IFR flying GA pilots are likely to conduct. Also, the target audience is generally pilots flying typical piston-engine GA aircraft. It is, therefore, proposed that:

— the BIR holders will be restricted to 200 ft above the published minima on an approach procedure, down to a maximum of 500 ft above ground level (AGL) for a 3D approach, or 600 ft AGL for a 2D approach. They will also be subject to an arrival and departure minima of 1 500 m visibility and a cloud base of not less than 600 ft or the published circling minimum applicable to the aeroplane category, whichever is greater;

— the BIR will only be used for single-pilot, non-high-performance aircraft and may not be used for aircraft for which the relevant operational suitability data (OSD) has determined that an IR is required.

Other than the above limitations, the privileges will be the same as in Part-FCL CB-IR and EIR, with no restrictions on where the privileges may be used in terms of airspace or other factors.

2.4.4. Theoretical knowledge

To ensure a greater level of proportionality than is the case for the current CB-IR theoretical knowledge requirements, it is proposed that each training module is supported by an exam incorporating the relevant learning objectives, resulting in a total of three focused exams.

Learning objectives will not duplicate topics already examined at PPL level, but will focus only on objectives appropriate for the safe operation of GA aircraft in IMC or under IFR. The scope and depth of knowledge should be broadly similar to that required for the FAA IR.

The Agency wishes to make the exam process as straightforward as possible. The questions will have to be taken from the relevant areas of the European Central Question Bank (ECQB), otherwise the BIR would require entirely new questions, something that the Agency and the EASA Member States do not have the resources for. It is intended that EASA Member States shall adopt a secure process that would allow the exams to be conducted at training organisations equipped with the appropriate technology to meet the ECQB requirements.

2.4.5. Training organisations

While this NPA was under development, Opinion No 11/2016 'Training outside approved training organisations' was published on 7 September 2016[10]. The related rulemaking task (RMT.0657) was triggered by the objective of the GA Road Map to develop the possibility to conduct training towards non-commercial licences outside ATOs. Opinion No 11/2016 now proposes the introduction of a new category of training organisation, the 'declared training organisation' (DTO), and the addition of a new Annex VIII (Part-DTO) to Commission Regulation (EU) No 1178/2011. Apart from not having to obtain a prior approval, the new DTO benefits from simplified organisational requirements as well as from revised provisions for oversight by competent authorities. In return for these alleviations, the training scope of a DTO had to be limited. Among other things, training towards privileges to fly under IFR will not be part of the DTO's training scope. Please refer to Section 2.3.5 of Opinion No 11/2016 for further information. As a result, training for the BIR will need to take place at ATOs being approved in accordance with Annex VII (Part-ORA) to Commission Regulation (EU) No 1178/2011.

2.4.6. Instructor and examiner qualifications

Amending the relevant instructor ratings to accommodate the BIR is not within the scope of this NPA. Instead, the Agency will transfer the TF's draft proposals to the Rulemaking Group for RMT.0596 'Review of provisions for examiners and instructors (Subparts J and K of Part-FCL)'. RMT.0596 is dealing with this area, i.e. Subpart J and K of Part-FCL. These proposals are the following:

— All current instructors and examiners, who have the privilege to teach or examine for the IR, will also get the privilege to teach or examine for the BIR;

— An FI(A) holding a BIR, and having passed the instrument flying instructor (IRI) course, may teach for the BIR without being required to have completed 200 hours flight time under IFR; and

— An aeroplane flight examiner (FE(A)) may conduct skill tests for the initial issue, and for the revalidation or renewal of a BIR, provided they have 1 000 hours flight time as pilot-in-command

[10] https://www.easa.europa.eu/document-library/opinions/opinion-112016

(PIC) on aeroplanes, including 250 hours instruction, and have the privilege to conduct instrument flying instruction; and

— An aeroplane class rating examiner (CRE(A)) may conduct revalidation or renewals of BIRs, provided they have 1 000 hours flight time as pilot supervising (PS) on aeroplanes and have passed the IRI course.

2.4.7. Revalidation or renewal of BIR and of class or type ratings

The Agency considered it to be appropriate for the revalidation to introduce the concept of alternating between a proficiency check and an hour's instruction from an instructor qualified to teach for the BIR. Renewal will always be via a proficiency check.

Consideration was also given to the issue of combining the revalidation or renewal of the rating with that of a class or type rating that was within the scope of the privileges of the BIR. Appendix 9 to Part-FCL already establishes the possibility of revalidation of single-engine piston (SEP) class rating with an IR. There already exists the possibility to complete Section 3B in isolation, which would be needed to maintain IR privileges in-between the periodicity of the SEP. With the principle already established, there is only the need to include the BIR in the arrangement.

2.4.8. Language proficiency

The requirement in FCL.055(d) for holders of the IR regarding the demonstration of the ability to use the English language was considered by the Agency to be a possible barrier to the update of instrument flying qualifications amongst GA pilots. As a result of this, it is proposed not to amend FCL.055(d) to include the BIR into the language proficiency requirement.

The Agency strives to follow a more holistic approach as regards an eventual amendment to FCL.055 'Language proficiency' for GA pilots, which will be assessed as part of RMT.0678 'Simpler, lighter and better Part-FCL requirements for general aviation'[11].

2.4.9. Relationship between Part-FCL and third-country instrument ratings (IRs)

The Agency is aware of the need to have the proposed new BIR appropriately integrated in the context of the current Part-FCL provisions for IFR flying qualifications. To that end, there should be a proportionate upgrade path from the BIR to the full IR privileges via the existing competency-based (CB) route.

Applicants for the CB-IR, who hold the proposed BIR, would be credited for their previous instrument training and experience in accordance with the existing CB-IR provisions — for example, if 10 hours at an ATO had been conducted during training for the BIR, this would be credited for the purposes of the CB-IR. However, upgrade training would need to include items not covered in BIR training, for example, approaches to a 200 ft DH.

Appropriate credit for BIR holders towards the theoretical knowledge requirements of the CB-IR has also been carefully considered. For example, credit could be given in a manner similar to that agreed

[11] https://www.easa.europa.eu/system/files/dfu/ToR%20RMT.0678%20Issue%201.pdf

for the conversion of third-country IR holders, as an oral assessment conducted by the examiner during the skill test.

In the case of holders of third-country IRs, issued in accordance with ICAO Annex 1, and wishing to add a BIR to an existing Part-FCL licence, it is proposed to allow them to do so by passing a skill test and oral examination of theoretical knowledge. This route would be available to those with 25 hours or more of PIC time under IFR.

2.5. Aeroplane cloud flying rating

As discussed in the introduction in the RIA, the TF also considered the concept of a more basic rating that would be similar to the sailplane cloud flying rating in FCL.830, but for powered aeroplanes. The purpose of the rating would be to allow short-term entry into IMC, for example, to achieve 'VFR on top' and to mitigate the risks from unexpected IMC while conducting a flight under VFR. This rating would be attractive to those for whom the full BIR would not be justified, but who still desire some cloud penetration capability, for either safety or utility.

Since the primary focus of the TF's work is to propose a BIR in order to encourage planned IFR flights for GA, it was considered appropriate to propose that work on and consultation of aeroplane cloud flying rating to be included in RMT.0678 instead.

2.6. Overview of the proposed amendments

The rulemaking proposal developed in the present NPA includes:

— a complete review of Annex I (Part-FCL) aiming to introduce the BIR concept; and

— a complete review of the associated AMC and GM to Annex I (Part-FCL).

2.6.1. Part-FCL

(1) FCL.010 Definitions
(2) FCL.035 Crediting of flight time and theoretical knowledge
(3) FCL.600 IR — General
(4) FCL.740.A Revalidation of class and type ratings — aeroplanes
(5) FCL.835 Basic instrument rating (BIR) (*new*)
(6) APPENDIX 6 Modular training course for the IR

2.6.2. AMC/GM to Part-FCL

(1) GM1 FCL.010 Abbreviations
(2) GM1 FCL.835 Basic instrument rating (BIR) (*new*)
(3) GM2 FCL.835 Module 1 Pre-flight operations and general handling
(4) GM3 FCL.835 Module 2 Departure, precision (3D) approach procedures and non-precision (2D) approach procedures
(5) GM4 FCL.835 Module 3 En-route IFR procedures

2.6.3. Proposed amendments when EIR will be deleted (as described in 1.1.1.)

Deletion of:

(1) FCL.825 En route instrument rating (EIR)
(2) AMC1 FCL.825(a) En-route instrument rating (EIR)
(3) AMC1 FCL.825(c) En-route instrument rating (EIR)
(4) AMC2 FCL.825(d) En-route instrument rating (EIR)
(5) GM1 FCL.825(d) En-route instr**u**ment rating (EIR)
(6) AMC1 FCL.825(e);(g) En-route instrument rating (EIR)
(7) AMC1 FCL.825(g)(2) En-route instrument rating (EIR)
(8) AMC1 FCL.825(h) En-route instrument rating (EIR)
(9) AMC2 FCL.825(h) En-route instrument rating (EIR)
(10) AMC1 FCL.825(i) En-route instrument rating (EIR)

Amendments regarding the deletion of the references to FCL.825 and EIR in the following points and AMC/GM:

(1) FCL.055(d) Language proficiency
(2) FCL.600 IR — General
(3) GM1 FCL.010 Definitions
(4) AMC1 FCL.615(b) IR — Theoretical knowledge and flight instruction
(5) AMC2 FCL.615(b) IR — Theoretical knowledge and flight instruction
(6) AMC3 FCL.615(b) IR — Theoretical knowledge and flight instruction
(7) AMC4 FCL.615(b) IR — Theoretical knowledge and flight instruction
(8) AMC5 FCL.615(b) IR — Theoretical knowledge and flight instruction
(9) AMC6 FCL.615(b) IR — Theoretical knowledge and flight instruction
(10) AMC7 FCL.615(b) IR — Theoretical knowledge and flight instruction
(11) AMC8 FCL.615(b) IR — Theoretical knowledge and flight instruction
(12) GM1 FCL.615(b) IR — Theoretical knowledge and flight instruction
(13) AMC1 FCL.720.A(b)(2)(i) Experience requirements and prerequisites for the issue of class or type ratings — aeroplanes
(14) AMC2 FCL.720.A(b)(2)(i) Experience requirements and prerequisites for the issue of class or type ratings — aeroplanes

3. Proposed amendments

The text of the amendment is arranged to show deleted text, new or amended text as shown below:

(a) deleted text is ~~struck through~~;

(b) new or amended text is highlighted in grey;

(c) an ellipsis […] indicates that the remaining text is unchanged.

3.1. Draft Regulation (draft EASA opinion)

(1) FCL.010 is amended as follows:

'**FCL.010 Definitions**

'For the purposed of this Part, the following definitions apply:

[…]

'en-route' means that part of a cross-country flight which is not under the control of an approach control service or an aerodrome control service.

[…]

(2) FCL.035 is amended as follows:

'FCL.035 Crediting of flight time and theoretical knowledge

[...]

(b) Crediting of theoretical knowledge

(1) An applicant having passed the theoretical knowledge examination for an airline transport pilot licence shall be credited with the theoretical knowledge requirements for the light aircraft pilot licence, the private pilot licence, the commercial pilot licence and, except in the case of helicopters, the IR, ~~and~~ the EIR and the basic instrument rating (BIR) in the same category of aircraft.

(2) An applicant having passed the theoretical knowledge examination for a commercial pilot licence shall be credited with the theoretical knowledge requirement for:

(i) a light aircraft pilot licence ~~or~~ in the same category of aircraft;

(ii) a private pilot licence in the same category of aircraft; and

(iii) the theoretical knowledge examination for the BIR, except IFR communications.

(3) The holder of an IR or an applicant having passed the instrument theoretical knowledge examination for a category of aircraft shall be fully credited towards the requirements for the theoretical knowledge instruction and examination for an IR in another category of aircraft and the BIR.

[...]'

(3) FCL.600 is amended as follows:

'**FCL.600 IR — General**

Except as provided in FCL.825 and FCL.835, operations under IFR on an aeroplane, helicopter, airship or powered-lift aircraft shall only be conducted by holders of a PPL, CPL, MPL and ATPL with an IR appropriate to the category of aircraft or when undergoing skill testing or dual instruction.'

(4) FCL.740.A is amended as follows:

'**FCL.740.A Revalidation of class and type ratings — aeroplanes**

(a) Revalidation of multi-engine class ratings and type ratings. For revalidation of multi-engine class ratings and type ratings, the applicant shall:

[…]

(4) The revalidation of a BIR, an ~~En-route Instrument Rating (~~EIR) or an IR(A), if held, may be combined with a proficiency check for the revalidation of a class or type rating.

(b) Revalidation of single-pilot single-engine class ratings.

(1) Single-engine piston aeroplane class ratings and TMG ratings. For the revalidation of single-pilot single-engine piston aeroplane class ratings or TMG class ratings, the applicant shall:

[...]

(5) The revalidation of a BIR may be combined with a proficiency check for the revalidation of a single-pilot single-engine aeroplane class rating.

[...]'

(5) New point 'FCL.835 Basic instrument rating (BIR)' is inserted in SUBPART I 'ADDITIONAL RATINGS' as follows:

'**FCL.835 Basic instrument rating (BIR)**

(a) Privileges and conditions

(1) The privileges of a BIR holder are to conduct flights under IFR on single-pilot aeroplanes for which class ratings are held, excluding high-performance aeroplanes or aeroplane variants for which operational suitability data has determined that an IR or competency-based instrument rating is required.

(2) BIR privileges shall only be exercised in accordance with FCL.205.A and after completion of the relevant training modules of FCL.835(c).

(3) BIR privileges may be exercised at night if the pilot holds a night rating in accordance with FCL.810.

(4) BIR privileges on multi-engine aeroplanes shall also be valid on single-engine aeroplanes for which the pilot holds a valid single-engine class rating.

(5) The exercise of BIR privileges shall be subject to the following conditions:

(i) instrument approach procedures shall be subject to a further addition of 200 ft to published minima, but subject to an absolute minimum height of 500 ft for a 3D approach or 600 ft for a 2D approach; and

(ii) the weather conditions at the aerodrome of departure, arrival and at any planned alternate aerodrome shall include a minimum flight visibility of 1 500 m and a minimum cloud base of either 600 ft or the published circling minimum applicable to the aeroplane category, whichever is the greater.

(b) Prerequisites. Applicants for the BIR shall hold at least a PPL(A).

(c) Training course. Applicants for the BIR shall have completed at an ATO:

(1) theoretical knowledge instruction in accordance with FCL.615(a); and

(2) instrument flight instruction modules:

(i) the core flying training module of flight handling skills by sole reference to instruments;

(ii) the applied flying training module of IFR departure, holding, 2D and 3D approach procedures;

(iii) the applied flying training module of en-route IFR flight procedures.

(d) Notwithstanding point (c), the module as referred to in point (c)(2)(iii) may be delivered outside an ATO.

(e) If BIR privileges are sought for multi-engine aeroplanes, instrument flight training under instruction in multi-engine aeroplanes, including asymmetric instrument approach and go-around procedures.

(f) Theoretical knowledge. Prior to taking the skill test, the applicant shall demonstrate a level of theoretical knowledge appropriate to the privileges granted in the subjects referred to in FCL.615(b).

(g) Skill test. After the completion of the training, the applicant shall pass a skill test in an aeroplane. For a multi-engine BIR, the skill test shall be taken in a multi-engine aeroplane. For a single-engine BIR, the skill test shall be taken in a single-engine aeroplane.

(h) Notwithstanding (f), the holder of a single-engine BIR, who also holds a multi-engine class rating, wishing to obtain a multi-engine BIR for the first time, shall complete a course of training at an ATO comprising (e) and shall pass the skill test referred to in (g).

(i) Validity, revalidation and renewal

(1) A BIR shall be valid for 1 year.

(2) Applicants for the revalidation of a BIR shall within a period of 3 months immediately preceding the expiry date of the rating:

(i) pass a proficiency check in an aeroplane; or

(ii) complete at least 1 hour of instrument flight time with an instructor holding privileges to provide training for the BIR.

(3) For each alternate subsequent revalidation, the holder of the BIR shall pass a proficiency check in accordance with point (i)(2)(i).

(4) If a pilot chooses to fulfil the revalidation requirements earlier than prescribed, the new validity period shall commence from the date of the proficiency check or flight with an instructor.

(5) Applicants who fail to pass the relevant section of a BIR proficiency check before the expiry date of the BIR shall not exercise the BIR privileges until they have passed the proficiency check.

(6) If a BIR has expired, in order to renew their privileges, applicants shall:

(i) complete refresher training provided by an instructor holding privileges to provide training for the BIR to reach the level of proficiency needed; and

(ii) complete a proficiency check.

(7) For a multi-engine BIR, the proficiency check for the revalidation or renewal, and the flying training required in point (i)(2)(ii), have to be completed in a multi-engine aeroplane.

(8) The proficiency check for revalidation or renewal of a BIR may be combined with a proficiency check for the renewal of a single-pilot aeroplane class rating on which BIR privileges may be exercised in accordance with FCL.835(a)(1).

(j) Notwithstanding (c) and (d), the holder of an EIR in accordance with FCL.825, who wishes to obtain a BIR, shall complete a training course at an ATO comprising point (c)(2)(ii) and shall pass the relevant sections of the skill test referred to in point (g);

(k) Applicants for the BIR holding a Part-FCL PPL or CPL and a valid IR(A) issued in accordance with the requirements of Annex 1 to the Chicago Convention by a third country may be credited in full towards the training course mentioned in point (c)(2). In order to be issued with the BIR, the applicants shall:

(1) successfully complete the skill test referred to in point (g);

(2) demonstrate to the examiner during the skill test that they have acquired an adequate level of theoretical knowledge of air law, meteorology, and flight planning and performance; and

(3) have a minimum experience of at least 25 hours of flight time under IFR as PIC on aeroplanes.'

(6) 'Appendix 6 — Modular training courses for the IR' is amended as follows:

'*Appendix 6*
Modular training courses for the IR
[…]

Aa. **IR(A) — Competency-based modular flying training course**

[…]

9. Applicants for the IR(A) competency-based modular flying training course holding a BIR in accordance with FCL.835, and who have received at least 10 hours of instrument flight time under instruction at an ATO, may be credited in full towards the training course mentioned in paragraph 4, provided that all competency-based instrument rating topics have been included.

10. Applicants for the IR(A) competency-based modular flying training course holding a BIR shall have at an ATO:

(a) been approved as having an acceptable standard of competency-based instrument rating theoretical knowledge;

(b) received appropriate flight training to extend IFR privileges in accordance with FCL.605.IR(a);

(c) successfully completed the skill test for the IR(A) in accordance with Appendix 7;

(d) demonstrated to the examiner during the skill test that they have acquired an adequate level of theoretical knowledge of air law, meteorology, and flight planning and performance; and

(e) a minimum experience of at least 50 hours of flight time under IFR as PIC on aeroplanes.

PRE-ENTRY ASSESSMENT

~~9~~11. The content and duration of the pre-entry assessment shall be determined by the ATO based on the prior instrument experience of the applicant.

MULTI-ENGINE

~~10~~12. The holder of a single-engine IR(A) who also holds a multi-engine class or type rating wishing to obtain a multi-engine IR(A) for the first time shall complete a course at an ATO comprising at least 5 hours instrument time under instruction in multi-engine aeroplanes, of which 3 hours may be in an FFS or FNPT II and shall pass a skill test.

[...]'

3.2. Draft acceptable means of compliance and guidance material (draft EASA decision)

(1) GM1 FCL.010 is amended as follows:

'**GM1 FCL.010 Abbreviations**

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

[…]

BIR Basic instrument rating

[…]'

(2) New GM1 FCL.835 'Basic instrument rating (BIR)' is inserted as follows:

'**GM1 FCL.835 Basic instrument rating (BIR)**

BASIC INSTRUMENT RATING (BIR) COMPETENCIES

This GM provides the competency criteria required for the relevant training modules of the BIR.

(a) Modules

The following modules are applicable:

(1) Module 1: Pre-flight operations and general handling;

(2) Module 2: Departure, precision (3D) approach procedures and non-precision (2D) approach procedures;

(3) Module 3: En-route IFR procedures;

(4) Module 4: Optional flight with one engine inoperative (multi-engine aeroplanes only).

Upon completion of the training, an applicant for a BIR should have received instruction on the same class of aeroplane to be used in the test.

(b) Flight tolerances

The following limits should apply and it should be borne in mind that such tolerances are expected only at the end of the training. Due consideration should be given to make allowance for turbulent conditions and the handling qualities and performance of the aircraft used:

Height	
Generally	± 100 feet
Starting a go-around at decision height or altitude	+ 50 feet/– 0 feet
Minimum descent height, MAP or altitude	+ 50 feet/– 0 feet

Heading	
All engines operating	± 5°
With simulated engine failure	± 10°

Speed	
All engines operating	± 5 knots
With simulated engine failure	+ 10 knots/– 5 knots

On radio aids	±5°
For ‘angular’ deviations	Half-scale deflection, azimuth and glide path (e.g. LPV, ILS, MLS, GLS)
2D (LNAV) and 3D (LNAV/VNAV) ‘linear’ lateral deviations	Cross-track error/deviation shall normally be limited to ± ½ the RNP value associated with the procedure. Brief deviations from this standard up to a maximum of one time the RNP value are allowable.
3D linear vertical deviations (e.g. RNP APCH (LNAV/VNAV) using Baro VNAV)	Not more than – 75 feet below the vertical profile at any time, and not more than + 75 feet above the vertical profile at or below 1 000 feet above aerodrome level.

Given that the intention of the training for the BIR is to be entirely competency-based, the student and instructor need detailed guidance on these competencies. The following information is intended to provide that guidance. Each element of the training modules is described in text followed by a table which gives guidance on the competencies required and how to assess them using the key competencies model of:

OBJECTIVE (of the training item), and **SKILL — KNOWLEDGE — ATTITUDE** (to achieve the objective)

(c) Sample table

The table is separated into four rows as follows:

Training element	
3.2.1. Title of assessed item taken from training module	
OBJECTIVE	This cell describes the applicant's proficiency to be assessed by the training organisation or instructor.
SKILL	This cell describes the competency criteria that involve the applicant demonstrating: — manual aircraft control; — effective flight path management through proper use of flight management system guidance and automation; and — application of procedures.
KNOWLEDGE	This cell describes the knowledge needed to meet the objective's proficiency requirements.
ATTITUDE	This cell describes the competency criteria encapsulated by airmanship, crew resource management (CRM), and threat and error management (TEM), such as: — situation awareness; — effective communication; — leadership and teamwork; — effective workload management; — effective problem-solving and decision-making.
General	
In most phases of flight there are competencies that apply to a group of manoeuvres, e.g. turns, or even to the whole phase of flight. In order to avoid repetition, the common competencies are grouped under the 'General' item heading.	

(d) Content of the training

(1) Module 1: Pre-flight operations and general handling

Use of flight manual (or equivalent), especially for aircraft performance calculation, and mass and balance

Module 1: Pre-flight operations and general handling	
Use of flight manual (or equivalent), especially for aircraft performance, and mass and balance	
OBJECTIVE	(A) Proficient in the use of the flight manual (or equivalent). (B) Proficient in the mass and balance schedule. (C) Proficient in the aircraft performance calculation.
SKILL	(A) Use proficiently performance charts, tables, graphs or other data, when available, relating to items such as: (1) accelerate-stop distance; (2) accelerate-go distance; (3) take-off performance; (4) one engine inoperative; (5) climb performance; (6) cruise performance; (7) fuel consumption, range, and endurance; (8) go-around from rejected landing; (9) operational factors affecting aircraft performance; (10) other performance data appropriate to the test aircraft; (11) airspeeds used during specific phases of flight; (12) effects of meteorological conditions upon performance characteristics and correctly applies these factors to a specific chart, table, graph or other performance data; (13) impact of relevant NOTAMs on the conduct of the flight; (14) aircraft documentation.
KNOWLEDGE	(A) Part-NCO (Non-commercial air operations). (B) Pilot operating manual (POM) or flight manual chapters dedicated to: (15) limitations; (16) performance calculation in general; (17) performance calculation and associated procedures when specific conditions exist.
ATTITUDE	(A) Situation awareness: understand the responsibilities of proper pre-departure planning and preparations. (B) Effective communication: ensure appropriate and clear communication with all ground service personnel (ATC, dispatch, MET). (C) Leadership and teamwork: manage crew, passengers, ground personnel, as applicable. (D) Effective workload management: provide sufficient time and manage the workload for pre-flight procedures (including documentation) to be completed in an efficient manner. (E) Effective problem-solving and decision-making: (1) make appropriate decisions on all identified threats; (2) plan and implement suitable mitigation actions.

Pre-flight inspection

Module 1: Pre-flight operations and general handling	
Pre-flight inspection	
OBJECTIVE	Full initial pre-flight inspection in accordance with the approved checklist assuming the risk to IFR flights such as icing conditions, database, etc.
SKILL	(A) Perform all elements of the aeroplane pre-flight inspections. (B) Confirm that the aeroplane is in a serviceable and safe condition for IFR flight.
KNOWLEDGE	(C) (A) Confirm the validity of database and receiver autonomous integrity monitoring (RAIM) prediction. (D) (B) Be aware of the possible effects of equipment defects or unserviceability.
ATTITUDE	(A) Situation awareness: (1) note the position of the aircraft, any surrounding hazards, and location of emergency equipment, and take appropriate action to minimise potential risks; (2) note effects of engine start on the surrounding environment; (3) note the limitations of software and equipment such as flight director (FD), autopilot (AP), etc. (B) Effective communication: (1) demonstrate correct communication; (2) make a correct passenger and departure briefing. (C) Leadership and teamwork: demonstrate correct coordination. (D) Effective workload management: (1) confirm from the checklist that all pre-flight requirements have been fulfilled (2) demonstrate an organised approach to performing inspection of aircraft and equipment. (E) Effective problem-solving and decision-making: (1) identify possible defects and threats; (2) take corrective action.

Taxiing

Module 1: Pre-flight operations and general handling	
Taxiing	
OBJECTIVE	(A) Be proficient in all recommended taxiing checks and procedures. (B) Comply with ATC instructions, airport markings and signals.
SKILL	(A) Obtain appropriate clearance before taxiing and before crossing or entering active runways. (B) Comply with instructions issued by ATC. (C) Maintain correct and positive aircraft control. (D) Take due consideration of environmental conditions (e.g. surface wind, contamination, surface condition, etc.). (E) Maintain adequate separation from other aircraft, obstructions, and persons. (F) Accomplish the applicable briefing or checklist items, and follow the recommended procedures.
KNOWLEDGE	(A) The need to correctly perform taxiing checks. (B) Understanding the following: (1) runway hold lines and stop bar lighting as applicable; (2) localiser and glide slope sensitive and critical areas; (3) beacons, as well as other surface control markings and lighting; (4) taxiing speeds; (5) rules and procedures in the event of loss of communication (priority, lighting signals); (6) rules for manoeuvring in reduced meteorological conditions.
ATTITUDE	(A) Situation awareness: (1) maintain constant vigilance and lookout during taxiing operation; (2) use headings in poor visibility conditions to confirm the path; (3) maintain awareness of taxiing speeds appropriate to the conditions and limitations. (B) Effective communication: demonstrate correct ATC communication (where applicable). (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: divide attention properly inside and outside the cockpit. (E) Effective problem-solving and decision-making: (1) stop the aircraft to check position when in doubt; (2) assess major risks: collision with other aircraft, obstacles, and aircraft security.

Transition to instrument flight

Module 1: Pre-flight operations and general handling	
Transition to instrument flight (must be performed by sole reference to instruments)	
OBJECTIVE	Establish the climb, complete a smooth transition to instrument flight, and complete post-take-off checks and drills.
SKILL	Following the initial take-off procedure: (A) compare the visual attitude achieved with the attitude indicator display; (B) assess the performance instrument information to confirm aircraft has achieved the desired climb parameters; (C) commence appropriate instrument scanning techniques.
KNOWLEDGE	(A) Demonstrate the required technical knowledge of the function of the instruments in order to safely fly the aircraft by sole reference to instruments. (B) Understand the need to compare the attitude indicator with the real world. (C) Understand the need to verify that expected performance has been achieved.
ATTITUDE	(A) Situation awareness: monitor aircraft flight path at all stages of the transition to instrument flight. (B) Effective communication: demonstrate effective communication (as applicable). (C) Leadership and teamwork: demonstrate effective coordination (as applicable). (D) Effective problem-solving and decision-making: (1) correctly assess take-off and climb hazards, particularly those related to other aircraft, aerodrome infrastructure, obstacles, and weather; (2) have a strategy to mitigate the threats.

ATC liaison — compliance, radio-telephony (RTF) procedures

	Module 1: Pre-flight operations and general handling
	ATC liaison — compliance, radio-telephony (RTF) procedures (must be performed by sole reference to instruments)
	(A) Ability to communicate clearly with ATC using appropriate RTF phraseology in order to perform the flight as planned in compliance with ATC instructions. (B) In the event of changes to the plan, such changes should be negotiated with ATC to ensure continued compliance.
SKILL	(A) ICAO language proficiency level 4 or greater. (B) The ability to use standard and, where applicable, non-standard RTF procedures. (C) Understand the implications of the received clearance, and be able to action the same safely and effectively. (D) Interpretation of charts and maps.
KNOWLEDGE	(A) Specific ATC phrases, e.g. ETA vs EAT. (B) Aircraft category for instrument approaches. (C) Performance of the aircraft and its ability to meet the ATC clearance. (D) ICAO standard phraseology and national differences. (E) Pilot or controller responsibilities including tower, en-route, and appropriate clearances. (F) Adequate knowledge of RTF failure procedures.
ATTITUDE	(A) Situation awareness: establish communication with ATC on the correct frequencies and at the appropriate times. (B) Effective communication: read back correctly, in a timely manner, the ATC clearance in the sequence received. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: copy correctly, in a timely manner, the ATC clearance as issued. (E) Effective problem-solving and decision-making: interpret correctly the ATC clearance received and, when necessary, request clarification, verification, or change.

Control of the aeroplane by reference solely to instruments, including: level flight at various speeds, trim

Module 1: Pre-flight operations and general handling (must be performed by sole reference to instruments)	
Control of the aeroplane by reference solely to instruments, including: level flight at various speeds, trim	
OBJECTIVE	(A) Smooth control of heading, altitude, speed, power, trim and ancillary controls. (B) Correct use of autopilot, where appropriate. (C) Demonstrate correct technique for instrument flight manoeuvring within specified limits. (D) Maintain balanced and trimmed flight.
SKILL	(A) Maintain altitude, heading and balance, by sole reference to instruments, using correct instrument confirmation, and coordinated control application. (B) Maintain altitude, heading and balance, whilst accelerating or decelerating to specific speeds, as determined by the aircraft flight manual, or as specified by the examiner. (C) Demonstrate correct procedure for pre-flight functional check of autopilot or flight director. (D) Demonstrate correct operating procedure for autopilot or flight director in all modes.
KNOWLEDGE	(A) Procedures for controlling the aircraft in accordance with the POM, aircraft flight manual and operations manual, as appropriate. (B) Autopilot system fitted to the aircraft. (C) Procedures for controlling the aircraft with automatic flight control systems, in accordance with the POM, aircraft flight manual and operations manual, as appropriate.
ATTITUDE	(A) Situation awareness: (1) maintain awareness of the autopilot modes selected, where applicable; (2) understand the need for trimmed, in-balance flight when manually flying the aircraft. (B) Effective communication: as applicable to the specific situation. (C) Leadership and teamwork: as applicable to the specific situation. (D) Effective workload management: use an appropriate 'division of attention' when completing flight log, etc., whilst manually controlling the aircraft. (E) Effective problem-solving and decision-making: prioritise activities to allow maintenance of correct instrument scan.

Climbing and descending turns with sustained rate-1 turn

Module 1: Pre-flight operations and general handling (must be performed by sole reference to instruments)	
Climbing and descending turns with sustained rate-1 turn	
OBJECTIVE	Complete a coordinated climb or descent and turn at rate 1 using: (A) the recommended climbing speed; or (B) descent speed and nominated rates of descent for the aircraft.
SKILL	(A) Establish the recommended entry airspeed in straight and level flight. (B) Roll into a coordinated climbing or descending turn with a bank angle commensurate with the speed to produce a rate-1 turn. Maintain the bank angle in a stable, balanced turn. (C) Apply smooth, coordinated pitch, bank, and power adjustments to maintain the specified attitude and airspeed. (D) Roll out of the turn and stabilise the aircraft in straight and level flight. (E) Recover accurately on to the desired heading and at the desired airspeed for straight and level flight.
KNOWLEDGE	(A) Speed and bank angle relationship to establish a rate-1 turn. (B) Recommended climb speed and power settings. (C) Recommended speed and power settings for descent at nominated descent rates.
ATTITUDE	(A) Effective workload management: demonstrate orientation throughout the manoeuvre. (B) Effective problem-solving and decision-making: react to departure from stabilised steep turn attitude.

Recovery from unusual attitudes, including sustained 45° bank turns and steep descending turns

Module 1: Pre-flight operations and general handling (must be performed by sole reference to instruments)	
Recovery from unusual attitudes, including sustained 45° bank turns and steep descending turns	
OBJECTIVE	Recover from unusual attitudes, including sustained 45° bank turns and steep descending turns using the correct technique to minimise height loss.
SKILL	(A) Interpretation of the instrument displays to identify the unusual attitude. (B) Application of the correct recovery technique. (C) Avoid any indication of an approaching stall, abnormal flight attitude, or exceeding any structural or operating limitation during any part of the manoeuvre.
KNOWLEDGE	Correct recovery technique using 'full' panel instruments with minimum height loss or gain, as appropriate.
ATTITUDE	(A) Situation awareness: (1) recognition of unusual attitude; (2) after recovery: why did the aircraft enter the unusual attitude, e.g. distraction, instrument failure, mishandling, hypoxia? (3) after recovery: is the aircraft above safety altitude? (4) which is a safe direction to fly whilst assessing the situation? (B) Effective workload management: address the situation to recover situation awareness. (C) Effective communication: (1) advise other crew members of the situation; (2) advise ATC if appropriate. (D) Leadership and teamwork: communicate and coordinate, as appropriate, during the recovery manoeuvre). (E) Effective problem-solving and decision-making: react promptly to departure from controlled flight.

Recovery from approach to stall in level flight, climbing/descending turns and in landing configuration

Module 1: Pre-flight operations and general handling (must be performed by sole reference to instruments)	
Recovery from approach to stall in level flight, climbing/descending turns and in landing configuration (may be performed in an FSTD, if approved for this procedure)	
OBJECTIVE	(A) Demonstrate how to conduct appropriate safety checks before stalling. (B) Establish the required aircraft configuration and stall entry, as appropriate, from straight and level or manoeuvring flight. (C) Maintain heading (or 10–30° bank angle, as required) to stall entry. (D) Recognise the symptoms of stall or approaching stall, and initiate the correct recovery action. (E) Recover, using the correct techniques and with minimum height loss, to return to a clean configuration best rate climb, or as otherwise directed by the examiner. (F) Complete all the necessary checks and drills.
SKILL	(A) Select an entry altitude in accordance with safety requirements. When accomplished in an FSTD, the entry altitude may be at low, intermediate or high altitude as appropriate for the aircraft and the configuration. (B) Slowly establish the pitch attitude (using trim, elevator or stabiliser), bank angle, and power setting that will induce stall at the desired target airspeed. Trim must not be used at less than 1.45 of V_S or flight manual restrictions. (C) Recognise and announce the first indication of a stall appropriate to the specific aircraft design and initiate recovery. (D) Recover to a reference airspeed, altitude and heading, allowing only the acceptable altitude or airspeed loss and heading deviation using the flight manual or operator safety manual. (E) Demonstrate smooth, positive control during entry, approach to a stall, and recovery.
KNOWLEDGE	(A) Academic knowledge. (B) Limitations. (C) Safety procedures before starting with stall exercises. (D) Stall recovery procedures and techniques. (E) Flight manual. (F) Operator safety manual.
ATTITUDE	(A) Situation awareness: ensure the aircraft is in a safe area and clear of hazards prior to accomplishing an approach to a stall. (B) Effective communication: communicate and coordinate. (C) Leadership and teamwork: coordinate to ensure that there is adequate separation from other aircraft before initiating the stall. (D) Effective workload management: as applicable to the specific situation. (E) Effective problem-solving and decision-making: as applicable to the specific situation.

Limited panel: stabilised climb or descent, level turns at rate 1 on to given headings, recovery from unusual attitudes

Module 1: Pre-flight operations and general handling (must be performed by sole reference to instruments)	
Limited panel: stabilised climb or descent, level turns at rate 1 on to given headings, recovery from unusual attitudes — only applicable to aeroplanes	
OBJECTIVE	Demonstrate continued control of the aircraft by interpreting aircraft attitude from aircraft standby instruments.
SKILL	(A) Complete flight in straight and level, and climbing and descending, at nominated speeds. Fly turns at rate 1 on to nominated headings using the correct technique and demonstrating correct instrument scan and interpretation. (B) Recover from unusual attitudes including sustained 45° bank turns and steep descending and climbing turns using the correct technique to minimise height loss.
KNOWLEDGE	(A) Demonstrate the theoretical knowledge and understand the dangers of 'looping error'. (B) Variation of technique. (C) Limitations of the use of direct-reading compass systems.
ATTITUDE	(A) Situation awareness: (1) recognition of unusual attitude; (2) after recovery: why did the aircraft enter the unusual attitude, e.g. distraction, instrument failure, mishandling, etc.? (3) after recovery: is the aircraft above safety altitude? (4) which is a safe direction to fly whilst assessing the situation? (B) Effective workload management: address the situation to recover situation awareness. (C) Effective communication: advise ATC if appropriate. (D) Leadership and teamwork: communicate and coordinate. (E) Effective problem-solving and decision-making: react promptly to departure from controlled flight.

(2) Module 2: Departure, precision (3D) approach procedures and non-precision (2D) approach procedures

Weather minima

Module 2: Departure and arrivals, 3D approach and 2D approach	
Weather minima	
OBJECTIVE	Confirmation of weather affecting departure, route, destination and diversion; acceptability for the flight. Determination of the expected instrument approach minimum heights/altitudes in accordance with NCO requirements.
SKILL	Ability to interpret published weather charts such as synoptic charts and coded messages (TAF, METAR, SNOWTAM, etc.).
KNOWLEDGE	(A) Air masses and local weather effects. (B) Weather codes. (C) NCO requirements.
ATTITUDE	(A) Situation awareness: (1) be able to interpret and understand the weather factors and all the associated potential hazards likely to affect the planned flight; (2) assess correctly whether the weather minima required at destination and diversion airfields are satisfactory for the conduct of the flight. (B) Effective communication: as applicable to the specific situation. (C) Leadership and teamwork: as applicable to the specific situation. (D) Effective workload management: as applicable to the specific situation. (E) Effective problem-solving and decision-making: make appropriate decisions based on available weather information.

Pre-take-off briefing, take-off

Module 2: Departure and arrivals, 3D approach and 2D approach	
Pre-take-off briefing, take-off	
OBJECTIVE	(A) Perform a safe take-off in compliance with ATC clearance, procedure margins and within the flight manual limits taking into account environmental conditions. (B) Obtain ATC clearance for departure, flight deck preparation, confirmation of departure, and passenger emergency briefing. Actions to be taken with regard to the aeroplane if an emergency occurs during departure should be covered in the pre-flight main briefing.
SKILL	(A) Obtain appropriate take-off clearance using standard RTF phraseology, and perform all required pre-take-off checks (including visually scanning for other aircraft). (B) Position the aircraft correctly for take-off taking into account any crosswind condition. (C) Apply the controls correctly to maintain longitudinal alignment on the centre line of the runway prior to initiating and during the take-off. (D) Set the throttle(s) to take-off power with appropriate checks (e.g. verify the expected engine performance, monitor engine controls, settings and instruments during take-off to ensure all predetermined parameters are maintained). (E) Use the correct take-off technique by applying recommended speeds for rotation, lift-off and initial climb. (F) Adjust the controls to attain the desired pitch attitude at the predetermined airspeed to obtain the desired performance. (G) Ensure a safe climb and departure in accordance with clearance and with due regard for other air traffic, noise abatement and wake turbulence avoidance procedures, adjusting power and aircraft configuration, and maintain desired path (or heading) as appropriate. (H) Complete all necessary post-take-off checks. (I) Perform or call for and verify the accomplishment of landing gear and flap retractions, power adjustments, and other required pilot-related activities at the required airspeeds within the tolerances established in the flight manual.
KNOWLEDGE	(A) Limitations, procedure margins. (B) Normal procedures (understand the different techniques dependent on varying flap settings and environmental conditions). (C) Abnormal and emergency procedures. (D) Performance. (E) Applicable rules on wake turbulence separation.
ATTITUDE	(A) Situation awareness: (1) monitor engine parameters for any deviations; (2) monitor aircraft acceleration during take-off; (3) monitor aircraft ground and flight path at all stages of the take-off procedure. (B) Effective communication: demonstrate effective crew communication (as applicable). (C) Leadership and teamwork: demonstrate effective crew coordination (as applicable). (D) Effective problem-solving and decision-making: correctly assess take-off and climb hazards, particularly those related to other aircraft, aerodrome infrastructure, obstacles and weather, and have a strategy to mitigate the threats.

Instrument departure procedures, altimeter-setting

Module 2: Departure and arrivals, 3D approach and 2D approach	
Instrument departure procedures, altimeter-setting (must be performed by sole reference to instruments)	
OBJECTIVE	Complete the standard instrument departure (SID) procedure or follow the ATC departure instructions; use of correct altimeter-setting procedure; maintain aeroplane control, speed, heading and level.
SKILL	(A) Identify any navigation aids used. (B) Follow any noise routing or departure procedures and ATC clearances. (C) Take appropriate anti-icing/de-icing actions. (D) Use the current and appropriate navigation publications for the proposed departure. (E) Make correct use of instruments, flight director, autopilot, navigation equipment and communication equipment appropriate to the performance of the departure. (F) Intercept and follow, in a timely manner, all courses, radials and bearings (QDM/QDRs) appropriate to the departure route and ATC clearance. (G) Comply, in a timely manner, with all ATC clearances, instructions and restrictions. (H) Perform the aircraft briefing or checklist items appropriate to the departure. (I) Adhere to airspeed restrictions and adjustments required by regulations, ATC and the flight manual. (J) Maintain the appropriate airspeed, altitude, headings and accurately track radials, courses, and bearing. (K) Complete the appropriate checklist.
KNOWLEDGE	(A) Weather phenomena, particularly the conditions favouring the formation of ice on the airframe and engines. (B) Limitations of the use of ground-based navigation aids. (C) Limitations of the use of RNAV (GNSS) derived navigational information. (D) Division of airspace and altimeter-setting procedures associated with the current airspace environment. (E) The departure procedure in use and the safety implications of not adhering to the procedure. (F) Altimetry procedures in accordance with the applicable regulations.
ATTITUDE	(A) Situation awareness: (1) understand any clearance limits or variations to SID/initial departure clearance instructed by ATC; (2) awareness of the aircraft performance and the ability to conform to ATC clearances (speed, height, time limits, etc.). (B) Effective communication: demonstrate correct ATC communication (where applicable). (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: prioritise attention properly between aircraft control, navigation and communication tasks. (E) Effective problem-solving and decision-making: make the necessary decisions to mitigate the effect of changing conditions that may affect aircraft (weather, navigation aid serviceability, ATC, etc.).

Holding procedure

Common to both 3D and 2D procedures (must be performed by sole reference to instruments)	
Holding procedure	
OBJECTIVE	Complete the appropriate entry procedure followed by a standard ICAO holding fix, using information in order to maintain protected area.
SKILL	(A) Make appropriate adjustments in order to arrive over the holding fix as close as possible to the 'expected approach time', if required. (B) Recognise arrival at the clearance limit or holding fix. (C) Comply with ATC reporting requirements. (D) Change to the recommended holding airspeed appropriate for the aircraft and holding altitude, so as to cross the holding fix at or below the maximum holding airspeed. (E) Follow the appropriate entry procedures in accordance with standard operational procedures or as required by ATC. (F) Use the correct timing criteria where required by the holding procedure or ATC. (G) Use wind-drift correction techniques accurately to maintain the appropriate joining and holding pattern and to establish and maintain the correct tracks and bearings. (H) Maintain the appropriate airspeed, altitude and headings accurately to establish and maintain the correct tracks and bearings. (I) Make appropriate adjustments to the procedure timing to allow for the effects of known wind.
KNOWLEDGE	(A) Holding endurance, including but not necessarily limited to fuel on board. (B) Fuel flow while holding. (C) Fuel required to alternate, etc.
ATTITUDE	(A) Situation awareness: establish communication with ATC on the correct frequencies and at the appropriate times. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate with crew members as appropriate. (C) Leadership and teamwork: demonstrate correct crew coordination (where applicable). (D) Effective workload management: monitor to ensure that flight profile complies with the cleared holding pattern. (E) Effective problem-solving and decision-making: react to navigation errors or unexpected systems malfunctions.

Setting and checking of navigation aids, identification of facilities

Module 2: 3D approach procedures **(must be performed by sole reference to instruments)**	
Setting and checking of navigation aids, identification of facilities	
OBJECTIVE	(A) Use of navigation aids with regard to promulgated range, identification and interpretation. (B) Use the RAIM prediction. (C) Use the correct RNP approach specifications (LPV, LNAV/VNAV).
SKILL	(A) Set and identify relevant navigation aids. (B) Confirm the availability and serviceability of selected navigation equipment.
KNOWLEDGE	(A) Systems: communication, navigation and auto-flight systems. (B) RNP approach specifications (LPV, LNAV/VNAV).
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) select radio aids appropriate to the intended approach; (3) PBN limitations; (4) temperature limitations (LNAV/VNAV). (B) Effective workload management: monitor to ensure safe flight profile whilst selecting and checking radio aids. (C) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate as appropriate. (D) Leadership and teamwork: demonstrate correct coordination (where applicable). (E) Effective problem-solving and decision-making: react to deviation errors or unexpected systems malfunctions.

Arrival procedures, altimeter checks

Module 2: 3D approach procedures **(must be performed by sole reference to instruments)**	
Arrival procedures, altimeter checks	
OBJECTIVE	Descent planning and consideration of minimum sector altitude (MSA) or terminal arrival altitude (TAA). Completion of the published arrival procedure or as instructed by ATC, including altimeter-setting or protected area, ATC liaison and RTF procedures.
SKILL	(A) Set and cross-check the appropriate altimeter settings. (B) Use the correct RTF procedures and terminology and comply with all ATC instructions and clearances. (C) Establish the appropriate aircraft configuration and airspeed for the phase of the approach. (D) Comply with the published arrival procedure or as required by ATC. (E) Interpretation of arrival charts.
KNOWLEDGE	(A) Altimetry procedures in accordance with the applicable regulations. (B) Knowledge of legends used in the approach charts. (C) Understand ATC procedures and RTF phraseology for the type of approach to be completed. (D) Knowledge of RNP arrival procedure.
ATTITUDE	(A) Situation awareness: establish communication with ATC on the correct frequencies and at the appropriate times. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate, as appropriate. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: monitor to ensure that flight profile complies with the approach procedure. (E) Effective problem-solving and decision-making: react to deviation errors or unexpected systems malfunctions.

Approach and landing briefing, including descent, approach, landing checks and missed approach

Module 2: 3D approach procedures **(must be performed by sole reference to instruments)**	
Approach and landing briefing, including descent, approach, landing checks and missed approach	
OBJECTIVE	The approach briefing including weather and confirmation of instrument approach procedure minima, and all procedures.
SKILL	(A) Complete the checks for landing and configure the aircraft appropriately. (B) Complete a brief own briefing with regard to arrival, holding, approach, minima, weather conditions, associated performances, taxiing and missed approach procedure.
KNOWLEDGE	(A) Use of checklist as appropriate. (B) Make the necessary adjustments to the published approach minima criteria for the aircraft approach category, and with due regard for: (1) NOTAMs; (2) inoperative navigation equipment; (3) inoperative visual aids associated with the landing environment; (4) reported weather conditions; (5) aircraft status (effects of any inoperative systems).
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) aircraft technical status. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate as appropriate. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: monitor to ensure that the flight profile complies with the approach procedure. (E) Effective problem-solving and decision-making: react to deviation errors or unexpected systems malfunctions.

Compliance with published approach procedure

Module 2: 3D approach procedures **(must be performed by sole reference to instruments)**	
Compliance with published approach procedure	
OBJECTIVE	(A) Compliance with the published 3D approach procedure. (B) Vertical and horizontal profile to the nominated minima in accordance with protected areas.
SKILL	(A) Manage the appropriate source of navigation system. (B) Complete the manoeuvring pattern as required to establish the final approach segment within the specified flight tolerances. (C) Establish a predetermined rate of descent at the point where the glide path begins, in order to follow the glide path. (D) Intercept and track within the prescribed limits. (E) Interpretation of approach chart.
KNOWLEDGE	(A) Systems: communication, navigation and auto-flight systems. (B) Approach chart for runway and procedure in use. (C) Autopilot and flight director limitations. (D) Auto-swap system. (E) Software and capacity system.
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) correctly interpret and understand the procedure to be flown; (3) autopilot and flight director limitations; (4) auto-swap system; (5) software and capacity system. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate as appropriate. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: monitor to ensure that the flight profile complies with the cleared procedure. (E) Effective problem-solving and decision-making: react to navigation errors or unexpected systems malfunctions.

Altitude, speed, heading control (stabilised approach)

Module 2: 3D approach procedures **(must be performed by sole reference to instruments)**	
Altitude, speed, heading control (stabilised approach)	
OBJECTIVE	(A) Establish a stabilised approach, in trim for the aeroplane configuration and speed, using the correct techniques for attitude, heading and power control. (B) Correct assessment of track and vertical path.
SKILL	(A) Establish the final approach and maintain the approach path in horizontal and vertical profile to minima. (B) Control the aircraft as necessary to achieve a stable approach path. (C) Arrive at the minima stable in order to make a correct decision to perform a landing, go-around or circling approach safely. (D) Prepare backup radio aids for continued approach in the event of radio aid or display equipment failure. (E) Use correct RTF procedures and terminology and comply with all ATC instructions and clearances.
KNOWLEDGE	(A) Horizontal and vertical tolerances. (B) Actions to be taken in the event of radio aid or display equipment failure. (C) Procedure in the event of loss of communication with ATC. (D) Procedure in the event of loss of integrity.
ATTITUDE	(A) Situation awareness: identify whether approach is not stabilised. (B) Effective communication: advise ATC if appropriate. (C) Leadership and teamwork: (1) demonstrate correct coordination (where applicable); (2) procedures for loss of approach capability. (D) Effective workload management: monitor to ensure that the flight profile remains safe. (E) Effective problem-solving and decision-making: make appropriate decision to abandon approach if required.

Setting and checking of navigation aids, identification of facilities

Module 2: 2D approach procedures **(must be performed by sole reference to instruments)**	
Setting and checking of navigation aids, identification of facilities	
OBJECTIVE	(A) Use of navigation aids with regard to promulgated range, identification and interpretation. (B) Use the RAIM prediction. (C) Use the correct RNP approach specifications. (D) Calculate the true attitudes as required.
SKILL	(A) Set and identify relevant navigation aids. (B) Confirm the availability and serviceability of selected navigation equipment.
KNOWLEDGE	(A) Systems: communication, navigation and auto-flight systems. (B) RNP approach specifications (LNAV). (C) True altitude calculation.
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) select radio aids appropriate to the intended approach. (B) Effective workload management: monitor to ensure safe flight profile whilst selecting and checking radio aids. (C) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate as appropriate. (D) Leadership and teamwork: demonstrate correct crew coordination (where applicable). (E) Effective problem-solving and decision-making: react to deviation errors or unexpected systems malfunctions.

Arrival procedures, altimeter checks

Module 2: 2D approach procedures **(must be performed by sole reference to instruments)**	
Arrival procedures, altimeter checks	
OBJECTIVE	(A) Descent planning and consideration of MSA or TAA. (B) Completion of the published arrival procedure or as instructed by ATC, including altimeter-setting or protected area, ATC liaison and RTF procedures.
SKILL	(A) Set and cross-check the appropriate altimeter settings. (B) Use the correct RTF procedures and terminology and comply with all ATC instructions and clearances. (C) Establish the appropriate aircraft configuration and airspeed for the phase of the approach. (D) Comply with the published arrival procedure or as required by ATC. (E) Interpretation of arrival charts.
KNOWLEDGE	(A) Altimetry procedures, in accordance with the applicable regulations. (B) Knowledge of the legends used in the approach charts. (C) Understand ATC procedures and RTF phraseology for the type of approach to be completed. (D) Knowledge of RNP arrival procedure.
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) PBN protected area. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate as appropriate. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: monitor to ensure that the flight profile complies with the approach procedure. (E) Effective problem-solving and decision-making: react to deviation errors or unexpected systems malfunctions.

Approach and landing briefing, including descent, approach, landing checks and missed approach

Module 2: 2D approach procedures **(must be performed by sole reference to instruments)**	
Approach and landing briefing, including descent, approach, landing checks and missed approach	
OBJECTIVE	The approach briefing including weather and confirmation of instrument approach procedure minima, and all procedures.
SKILL	(A) Complete the landing and configure the aircraft as appropriate. (B) Complete a brief own briefing with regard to arrival, holding, approach, minima, weather conditions, associated performances, taxiing and missed approach procedure.
KNOWLEDGE	(A) Use of checklist as appropriate. (B) Adjustments necessary to the published approach minima criteria for the aircraft approach category, and with due regard for: (1) NOTAMs; (2) inoperative navigation equipment; (3) inoperative visual aids associated with the landing environment; (4) reported weather conditions.
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) aircraft technical status. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate as appropriate. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: monitor to ensure that the flight profile complies with the approach procedure. (E) Effective problem-solving and decision-making. react to deviation errors or unexpected systems malfunctions.

Compliance with published approach procedure

Module 2: 2D approach procedures **(must be performed by sole reference to instruments)**	
Compliance with published 2D approach procedure	
OBJECTIVE	(A) Compliance with the published approach procedure. (B) Vertical and horizontal profile to the nominated minima in accordance with protected areas. (C) Use of the CDFA technique where appropriate.
SKILL	(A) Manage the appropriate source of navigation system. (B) Select and comply with the appropriate 2D instrument approach procedure. (C) Complete the manoeuvring pattern as required to establish the final approach segment within the specified flight tolerances and protected area. (D) Establish a predetermined rate of descent in order to follow the published path. (E) Intercept and track the final approach track within the prescribed limits. (F) Interpretation of approach chart. (G) Ability to interpret deviation. (H) Correct selection of navigation input to the display.
KNOWLEDGE	(A) Systems: communication, navigation and auto-flight systems. (B) Approach chart for runway and procedure in use. (C) CDFA technique where appropriate. (D) Autopilot and flight director limitations. (E) Software and capacity system.
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) correctly interpret and understand the procedure to be flown; (3) autopilot and flight director limitations; (4) software and capacity system. (B) (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate as appropriate. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: monitor to ensure that the flight profile complies with the cleared procedure. (E) Effective problem-solving and decision-making; react to navigation errors or unexpected systems malfunctions.

Altitude, speed and heading control (stabilised approach)

Module 2: 2D approach procedures **(must be performed by sole reference to instruments)**	
Altitude, speed and heading control (stabilised approach)	
OBJECTIVE	(A) Establish a stabilised approach, in trim for the aeroplane configuration and speed, using the correct techniques for attitude, heading and power control. (B) Correct assessment of track and rate of descent or vertical path angle.
SKILL	(A) Establish the final approach and maintain the approach path in horizontal and vertical profile to minima. (B) Control the aircraft as necessary to achieve a stable final approach. (C) Arrive at the minima stable in order to make a correct decision to perform a landing, go-around or circling approach safely. (D) Prepare backup radio aids for continued approach in the event of radio aid or display equipment failure. (E) Use correct RTF procedures and terminology, and comply with all ATC instructions and clearances.
KNOWLEDGE	(A) Horizontal and vertical tolerances. (B) Actions to be taken in the event of radio aid/display equipment failure. (C) Procedure in the event of loss of communication with ATC. (D) Procedure in the event of loss of integrity.
ATTITUDE	(A) Situation awareness: identify whether the approach is not stabilised. (B) Effective communication: advise ATC if appropriate. (C) Leadership and teamwork: (1) demonstrate correct coordination (where applicable); (2) procedures for loss-of-approach capability. (D) Effective workload management: monitor to ensure that the flight profile remains safe. (E) Effective problem-solving and decision-making: make appropriate decision to abandon approach if required.

Approach timing

Module 2: Specificities of conventional 2D approach procedures (must be performed by sole reference to instruments)	
Approach timing	
OBJECTIVE	Monitor or control the approach procedure using timing as necessary.
SKILL	Where DME information from ground-based beacons (VOR or NDB) or marker is not available, the applicant makes appropriate adjustments to the procedure timing to allow for the effects of known wind.
KNOWLEDGE	(A) Use of wind-effect correction techniques. (B) Use of wind-drift correction techniques to maintain the correct tracks, bearings and approximate distances.
ATTITUDE	(A) Situation awareness: (1) understand when approach timing techniques are required; (2) understand the impact required on the descent technique for the intermediate approach phase. (B) Effective workload management: use an appropriate 'division of attention' whilst controlling the aircraft in order to apply wind-corrected timing. (C) Effective communication: as applicable to the specific situation. (D) Leadership and teamwork: as applicable to the specific situation. (E) Effective problem-solving and decision-making: as applicable to the specific situation.

Go-around and missed approach action

Module 2: Common to both 3D and 2D procedures (must be performed by sole reference to instruments)	
Go-around and missed approach action	
OBJECTIVE	At the minima, or as directed by ATC, or in unstabilised approach, or in loss of integrity, make a smooth transition to a climb at the correct speed and complete the checks.
SKILL	(A) Initiate go-around action in case of unstabilised approach or loss of integrity. (B) Initiate go-around action at or above minima if safe landing is not possible. (C) Control the aircraft as necessary to achieve a stable and trimmed initial climb profile. (D) Ensure a safe climb and departure in accordance with ATC clearance and with due regard for other air traffic, noise abatement and wake turbulence avoidance procedures adjusting power and aircraft configuration, and maintain desired path (or heading) as appropriate. (E) Complete all necessary procedures and checks. (F) Select the missed approach if available.
KNOWLEDGE	(A) Go-around procedure. (B) Aircraft limitations for landing gear retraction, flap retraction and power plant. (C) Necessary RTF procedures. (D) Performance limitation. (E) Climate gradient. (F) Protected areas. (G) RNP approach specifications.
ATTITUDE	(A) Situation awareness: monitor aircraft flight path at all stages of the go-around. (B) Effective communication: (1) demonstrate effective communication (as applicable); (2) communicate with ATC when safe to do so. (C) Leadership and teamwork: demonstrate effective crew coordination (as applicable). (D) Effective problem-solving and decision-making: correctly assess go-around and climb hazards, particularly those related to other aircraft, aerodrome infrastructure, obstacles and weather, and have a strategy to mitigate the threats.

Landing

Module 2: Common to both 3D and 2D procedures (must be performed by sole reference to instruments)	
Landing	
OBJECTIVE	Visual landing or circle for landing, as appropriate, in a safe and controlled manner.
SKILL	(A) Landing: (1) acquire the required visual references and continue to land the aircraft; (2) make a smooth transition from instrument to visual flight; (3) join smoothly, if necessary, the visual approach flight path; (4) maintain a stable (speed, power, heading) approach until the flare; (5) complete post-landing checklist.
KNOWLEDGE	(A) Flight manual. (B) Limitations. (C) Normal procedures: Demonstrate adequate judgement and knowledge of the aircraft performance and systems in order to comply with published approach procedures for the equipment used for the approach.
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) controlled flight into terrain (CFIT); (3) balked landing. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate as appropriate. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: monitor to ensure that the flight profile complies with the approach procedure. (E) Effective problem-solving and decision-making: react to deviation errors or unexpected systems malfunctions.

ATC liaison — compliance, RTF procedures

Module 2: Common to both 3D and 2D procedures (must be performed by sole reference to instruments)	
ATC liaison — compliance, RTF procedures	
OBJECTIVE	(A) Use correct and standard RTF phraseology throughout. (B) Where appropriate, obtain ATC clearances and appropriate level of service. (C) Where required, comply with ATC clearances and instructions.
SKILL	(A) Comply with all ATC instructions and clearances. (B) Use correct RTF for ILS reporting procedure.
KNOWLEDGE	(A) ICAO standard phraseology. (B) Pilot/controller responsibilities to include tower en-route control and clearance. (C) Demonstrate adequate knowledge of two-way communications failure procedures.
ATTITUDE	(A) Situation awareness: establish communication with ATC on the correct frequencies and at the appropriate times. (B) Effective communication: read back correctly, in a timely manner, the ATC clearance in the sequence received. (C) Leadership and teamwork: demonstrate correct crew coordination (where applicable). (D) Effective workload management: copy correctly, in a timely manner, the ATC clearance as issued. (E) Effective problem-solving and decision-making: interpret correctly the ATC clearance received and, when necessary, request clarification, verification, or change.

(3) Module 3: En-route IFR procedures

Use of air traffic services document and weather document

Module 3: En-route IFR procedures	
Use of air traffic services document and weather document	
OBJECTIVE	(A) Use of the correct documents, including maps. (B) Use of charts and approach procedure plates to prepare flight plan and flight log. (C) Collating and interpreting weather documents to determine the route weather.
SKILL	(A) Ensure all required paperwork is correctly completed prior to the flight. (B) Interpretation of weather charts and coded messages (TAF, METAR, etc.).
KNOWLEDGE	(A) Weather factors that may affect the safe conduct of the flight (thunderstorms, fog, strong winds, gust factor, crosswinds at departure and destination aerodromes, snow, icing, etc.). (B) Type of approach to be flown, how to calculate approach minima from charts, operational limitations of ground-based aids when planning route, ability to interpret SID and STAR charts. (C) Coordination with ATC when submitting flight plan, implications of 'calculated take-off time', etc.
ATTITUDE	(A) Situation awareness: note potential weather hazards and act accordingly, submit flight plan in good time for planned departure. (B) Effective communication: communicate with ATC and ground crew to ensure timely start. (C) Leadership and teamwork: demonstrate correct crew coordination (where applicable). (D) Effective workload management: prioritise tasks to produce a safe and effective plan for the conduct of the flight. (E) Effective problem-solving and decision-making: (1) identify possible defects and threats; (2) take corrective action.

Preparation of ATC flight plan and IFR flight plan or log

Module 3: En-route IFR procedures	
Preparation of ATC flight plan and IFR flight plan or log	
OBJECTIVE	Preparation of the ATC IFR flight plan for the route, including any off-airway sectors, and preparation of a full navigation and RTF flight log.
SKILL	(A) Prepare the flight navigation log, update maps and charts, flight plan, and fuel plan. (B) Obtain and assess all elements of the prevailing and forecast weather conditions for the route. (C) Complete an appropriate flight navigation log. (D) Complete the required ATC flight plan(s) and ensure that all required airfields are addressed. (E) Determine that the aeroplane is correctly fuelled, loaded and legal for the flight. (F) Confirm any aeroplane performance criteria and limitations applicable in relation to runway and weather conditions.
KNOWLEDGE	Demonstrate sufficient knowledge of the regulatory requirements relating to instrument flight.
ATTITUDE	(A) Situation awareness: understand the responsibilities of proper pre-departure planning and preparations. (B) Effective communication: ensure appropriate and clear communication with all ground service personnel (ATC, dispatch, MET). (C) Leadership and teamwork. (D) Effective workload management: provide sufficient time, and manage the workload for departure procedures (including documentation) to be completed in an efficient manner. (E) Effective problem-solving and decision-making: make appropriate decisions on all identified threats, and plan and implement suitable mitigation actions.

Tracking, including interception, e.g. NDB, VOR, RNAV

Module 3: En-route IFR procedures	
Tracking, including interception, e.g. NDB, VOR, RNAV	
OBJECTIVE	(A) Intercept and maintain the route or amended route, including tracking to and from a position derived from NDB or VOR or RNAV (GNSS) using aircraft display. (B) Follow the flight-planned route or any other ATC route requirements within the specified limits. (C) Identify and use navigation systems correctly. (D) Use the correct altimeter-setting procedures and show awareness of protected areas.
SKILL	(A) Use the current and appropriate navigation publications for the proposed flight. (B) Intercept, in a timely manner, all courses, radials and bearings appropriate to the procedure, route, and ATC clearance. (C) Comply, in a timely manner, with all ATC clearances, instructions and restrictions. (D) Perform the aircraft briefing or checklist items appropriate to the arrival. (E) Adhere to airspeed restrictions and adjustments required by regulations, ATC and aircraft flight manual. (F) Maintain the appropriate airspeed, altitude and heading, and accurately track radials, courses and bearing (QDM/QDRs).
KNOWLEDGE	(A) Basic instrument rating knowledge. (B) Proper ATC phraseology. (C) Demonstrate adequate knowledge of: (1) flight manual; (2) limitations; (3) instrument patterns; (4) two-way communications failure procedures. (D) Systems: communication, navigation and auto-flight systems. (E) PBN specifications.
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) awareness of aircraft position in space. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) communicate as appropriate. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: monitor to ensure that the flight profile complies with the cleared en-route routing. (E) Effective problem-solving and decision-making: react to navigation errors or unexpected systems malfunctions.

Use of radio aids

Module 3: En-route IFR procedures (must be performed by sole reference to instruments)	
Use of radio aids	
OBJECTIVE	(A) Correct use of RNAV system and radio aids with regard to promulgated range, identification and interpretation. (B) Use of ATIS/VOLMET where available.
SKILL	(A) Use the current and appropriate navigation publications for the proposed flight. (B) Select a combination of radio aids that allow the aircraft position to be correctly determined. (C) Manage the display of such aids so that the navigational information is readily available. (D) Correctly identify the chosen radio aids using Morse code where appropriate, i.e. when there is no 'auto-ident'. (E) Correctly assess the functionality of radio aids, including RNAV, before using them for navigation. (F) Correctly check receiver autonomous integrity monitoring (RAIM) of GNSS systems. (G) Correctly input navigation planning data into the GNSS system where appropriate.
KNOWLEDGE	(A) Demonstrate the theoretical knowledge and understanding of: (1) the limitations and errors of VOR and NDB beacons, the limitations and errors of VOR and NDB receivers in the aircraft, and the resulting potential navigational error; (2) information pertinent to radio aids or RNAV operations contained in NOTAMs; (3) correct identification of ground-based radio aids; (4) the radio aid equipment and associated displays fitted to the aircraft. (B) Identify when a ground-based radio aid is radiating but the signal is not available for navigation.
ATTITUDE	(A) Situation awareness: (1) monitor flight progress and select the appropriate navigation systems to enable successful completion of the planned route; (2) awareness of aircraft position in space. (B) Effective communication: as applicable to the specific situation. (C) Leadership and teamwork: as applicable to the specific situation. (D) Effective workload management: use an 'division of attention' appropriately whilst controlling the aircraft and reset navigation aids. (E) Effective problem-solving and decision-making: react to navigation errors or unexpected systems malfunctions.

Level flight, control of heading, attitude and airspeed, power-setting, trim technique

Module 3: En-route IFR procedures	
Level flight, control of heading, attitude and airspeed, power-setting, trim technique	
OBJECTIVE	(A) Smooth control of heading, attitude and airspeed, power, trim and ancillary controls. (B) Correct use of autopilot where appropriate. (C) Demonstrate correct technique for instrument flight manoeuvring within specified limits. (D) Maintain balanced and trimmed flight.
SKILL	(A) Maintain altitude, heading and balance, by sole reference to instruments, using correct instrument confirmation, and coordinated control application. (B) Maintain altitude, heading and balance, whilst accelerating or decelerating to specific speeds, as determined by the aircraft flight manual. (C) Demonstrate correct procedure for pre-flight functional check of autopilot, flight director or navigation aircraft system. (D) Demonstrate correct operating procedure for autopilot or flight director in all modes.
KNOWLEDGE	(A) Procedures for controlling the aircraft in accordance with the aircraft flight manual and flight manual, as appropriate. (B) Autopilot, flight director and navigation system fitted to the aircraft.
ATTITUDE	(A) Situation awareness: (1) maintain awareness of the autopilot modes selected, where applicable; (2) understand the need for trimmed, in-balance flight when manually flying the aircraft; (3) maintain adequate scan rate before, during and after execution of any manoeuvre by reference to instruments and autopilot performance. (B) Effective communication: as applicable to the specific situation. (C) Leadership and teamwork: as applicable to the specific situation. (D) Effective workload management: use an appropriate ‘division of attention’ when completing flight log, etc., whilst manually controlling the aircraft. (E) Effective problem-solving and decision-making: prioritise activities to allow maintenance of correct instrument scan.

Altimeter-setting

Module 3: En-route IFR procedures	
Altimeter-setting	
OBJECTIVE	Follow the altimeter-setting procedure, and cross-check and monitor en-route protected areas.
SKILL	(A) Correct use and interpretation of altimeter subscale setting. (B) Cross-check against a second altimeter.
KNOWLEDGE	(A) National procedures, if different, regarding altimeter settings for the airspace the aircraft is occupying. (B) Effects of extremely low temperatures on altimeter indications. (C) Limitations and errors in altimeters due to construction or systems installed in the aircraft, etc.
ATTITUDE	(A) Situation awareness: (1) understand the airspace structure and make appropriate altimeter-settings; (2) be aware of minimum safe altitude, sector safe altitude, etc. (B) Effective workload management: as applicable to the specific situation. (C) Effective communication: use appropriate RTF procedures to update pressure settings. (D) Leadership and teamwork: as applicable to the specific situation. (E) Effective problem-solving and decision-making: where necessary identify and make appropriate decisions when confronted with system failures.

Timing and revision of estimated time of arrival (ETA) (en-route hold, if required)

Module 3: En-route IFR procedures	
Timing and revision of estimated time of arrival (ETA) (en-route hold, if required)	
OBJECTIVE	Understand the flight plan, and that clearance is to be completed correctly.
SKILL	(A) Use appropriate and up-to-date aeronautical charts. (B) Extract and record pertinent information from NOTAMs, the aerodrome or facility directory, and other flight publications. (C) Plot a course for the intended route of flight. (D) Select the most favourable altitudes. (E) Compute headings, flight time, and fuel requirements.
KNOWLEDGE	(A) Weather reports and forecasts. (B) Pilot and radar reports. (C) Winds and temperatures aloft. (D) ATC procedures related to timing, e.g. update of ETA if changed by ± 3 minutes, clearance limit, etc.
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) identify airspace, obstructions, and terrain features. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) demonstrate correct crew communication (where applicable). (C) Leadership and teamwork: demonstrate correct crew coordination (where applicable). (D) Effective workload management: Select the appropriate navigation systems or facilities and communication frequencies. (E) Effective problem-solving and decision-making: deal with unexpected navigation errors or systems malfunctions.

Monitoring of flight progress, flight log, fuel usage and management, systems management

Module 3: En-route IFR procedures	
Monitoring of flight progress, flight log, fuel usage and management, systems management	
OBJECTIVE	(A) Maintain a flight log by recording sufficient information. (B) Monitor the engine and aircraft systems throughout the flight. (C) Monitor fuel consumption versus fuel available and fuel required throughout the flight.
SKILL	(A) Follow the flight plan route in accordance with ATC. (B) Navigate by means of pre-appropriate navigation system for the cleared route. (C) Use the correct altimetry procedures. (D) Verify the aircraft's position in relation to the flight-planned route. (E) Correctly assess track error and make suitable adjustments to heading. (F) Correct and record the differences between pre-flight fuel, ground speed, and heading and time calculations and those determined en-route. (G) Complete all appropriate checklists. (H) Manage the flight in accordance with minimum altitude.
KNOWLEDGE	(A) National IFR rules. (B) Policy concerning IFR flights. (C) Services expected in different classes of airspace. (D) Danger restricted, and prohibited areas. (E) Minimum altitude and protected areas.
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) identify airspace and minimum altitudes. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) demonstrate correct communication (where applicable). (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: select appropriate navigation systems or facilities and communication frequencies. (E) Effective problem-solving and decision-making: deal with unexpected navigation errors or systems malfunctions.

Ice protection procedures, simulated if necessary

Module 3: En-route IFR procedures	
Ice protection procedures, simulated if necessary	
OBJECTIVE	(A) Monitoring of outside air temperature (OAT), icing risk and ice accretion rate (on FSTD if necessary); correct use of anti-icing and de-icing procedures. (B) Manage flight in icing conditions.
SKILL	(A) Assessment of ice accretion on aircraft. (B) Appropriate selection of anti-icing or de-icing systems. (C) Adapt the aircraft speed to stay within the flight manual limitations, if any. (D) Adapt the performance within the icing conditions. (E) Decision-making to avoid icing conditions.
KNOWLEDGE	(A) Weather reports and forecasts. (B) ATC, pilot and radar reports. (C) Surface analysis charts. (D) Ground radar summary charts. (E) Significant weather prognostics. (F) Forecast upper wind and temperature for aviation (WINTEM). (G) Freezing level. (H) SIGMETs. (I) ATIS and VOLMET reports. (J) Aircraft anti-icing and de-icing system limitations. (K) Significant weather chart (TEMSI).
ATTITUDE	(A) Situation awareness: (1) understand the environmental conditions which can lead to the formation of ice on the aircraft; (2) assess when ice accretion is outside the capability of the aircraft systems. (B) Effective communication: (1) liaise with ATC to avoid known icing conditions; (2) request change of route or level to avoid icing conditions. (C) Leadership and teamwork: demonstrate correct crew coordination (where applicable). (D) Effective workload management: select appropriate navigation systems or facilities and communication frequencies. (E) Effective problem-solving and decision-making: (1) deal with unexpected encounters with icing conditions or systems malfunctions; (2) seek reroute or change of level in a timely manner.

ATC liaison — compliance, RTF procedures

Module 3: En-route IFR procedures	
ATC liaison — compliance, RTF procedures	
OBJECTIVE	ATC liaison using the correct RTF procedures and phraseology, and compliance with ATC procedures and clearances.
SKILL	(A) Follow the flight-planned route or any other ATC route requirements within the specified operating limits. (B) Identify and use navigation systems correctly. (C) Monitor whether ATC clearance is in accordance with a safe flight. (D) Use the correct RTF procedures and phraseology.
KNOWLEDGE	ICAO (language proficiency level 4, minimum) and national RTF procedures.
ATTITUDE	(A) Situation awareness: (1) establish communication with ATC on the correct frequencies and at the appropriate times; (2) identify airspace, and understand ATC clearances. (B) Effective communication: (1) read back correctly, in a timely manner, the ATC clearance in the sequence received; (2) demonstrate correct communication (where applicable). (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: select the appropriate navigation systems or facilities and communication frequencies. (E) Effective problem-solving and decision-making: deal with unexpected navigation errors or systems malfunctions.

(4) Module 4: Optional flight with one engine inoperative (multi-engine aeroplanes only)

Simulated engine failure after take-off or during go-around

Module 4: Optional flight with one engine inoperative (multi-engine aeroplanes only) **(must be performed by sole reference to instruments)** **(Multi-engine aeroplanes only)**	
Simulated engine failure after take-off or during go-around (at a safe altitude unless conducted in an adapted FSTD)	
OBJECTIVE	(A) Maintain the flight path after take-off or during go-around with one engine inoperative. (B) Comply with ATC instructions.
SKILL	(A) Maintain control following engine failure with sole reference to instruments. (B) Prepare a strategy in case of engine failure or go-around. (C) Calculate one-engine-inoperative performance. (D) Adapt minima on take-off or in approach in accordance with the performance. (E) Carry out the recommended emergency procedures.
KNOWLEDGE	(A) Operating manual: (1) all systems; (2) limitations; (3) abnormal procedures; (4) Part-NCO; (5) performance; (6) CS-23. (B) Operator policy dedicated to failure during take-off: in particular, operator engine out path during take-off.
ATTITUDE	(A) Situation awareness: (1) recognise engine failure, and confirm correct engine; (2) performance limitations; (3) strategy threats. (B) Effective communication: communicate appropriately with ATC. (C) Leadership and teamwork: demonstrate correct crew coordination (where applicable). (D) effective workload management: (1) apply appropriate abnormal or emergency procedures, time permitting, to resolve reason for (2) engine failure; (3) management of flight path close to the ground. (E) Effective problem-solving and decision-making: identify critical situation and make timely decision on suitable actions to carry out a safe asymmetric flight path.

Approach, go-around and procedural missed approach with one engine inoperative

Module 4: Optional flight with one engine inoperative (multi-engine aeroplanes only) **(must be performed by sole reference to instruments)** **(Multi-engine aeroplanes only)**	
Approach, go-around and procedural missed approach with one engine inoperative	
OBJECTIVE	(A) Manage IFR approach path during engine failure. (B) Maintain a stable approach in the correct configuration. (C) Make a clear decision to land or go around no later than the appropriate committal height or minima. (D) Complete asymmetric approach and go-around into visual circuit, circling approach or further instrument approach, maintaining control and correct speeds. (E) Initiate go-around action in case of destabilised approach. (F) Complete procedures and checks.
SKILL	(A) Apply the appropriate power setting for the flight condition and establish a pitch attitude necessary to achieve the desired performance. (B) Retract the wing flaps or drag devices and landing gear, if appropriate, in the correct sequence. (C) Accomplish the appropriate procedures or checklist items in a timely manner in accordance with the flight manual.
KNOWLEDGE	(A) Flight manual: (1) all systems; (2) limitations; (3) abnormal procedures; (4) patterns; (5) Part-NCO; (6) performance; (7) CS-23. (B) Operator policy dedicated to approach stabilisation criteria.
ATTITUDE	(A) Situation awareness: recognise whether the approach profile is not stabilised. (B) Effective communication: communicate appropriately with ATC. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: apply appropriate abnormal procedures for asymmetric approach and go-around. (E) Effective problem-solving and decision-making: (1) identify whether a critical situation is occurring due to inappropriate approach profile; (2) make a timely decision to execute a go-around.

Approach and landing with one engine inoperative

Module 4: Optional flight with one engine inoperative (multi-engine aeroplanes only) **(must be performed by sole reference to instruments)** **(Multi-engine aeroplanes only)**	
Approach and landing with one engine inoperative	
OBJECTIVE	(A) Establish the approach and landing configuration appropriate for the selected runway and prevailing meteorological conditions, and adjust the engine controls as required. (B) Complete the applicable pre-landing checklist. (C) Maintain a stabilised approach at the desired airspeed. (D) Maintain the operating engine(s) within acceptable operating limits. (E) Accomplish a smooth, positively controlled transition from instrument reference to visual reference. (F) Join smoothly, if necessary, the visual approach flight path. (G) Complete the applicable post-landing briefing or checklist items in a timely manner, after clearing the runway, and as recommended by the manufacturer.
SKILL	(A) Consider the actual weather and wind conditions, landing surface and obstructions. (B) Maintain a stable approach in the correct configuration. (C) Plan and follow suitable approach pattern and orientation with the landing runway. (D) Establish the correct approach configuration, adjusting speed and rate of descent to maintain a stabilised approach path. (E) Make a clear decision to land or go around no later than the appropriate committal height or minima. (F) Select and achieve the appropriate touchdown area at the required speed.
KNOWLEDGE	(A) Flight manual: (1) all systems; (2) limitations; (3) abnormal procedures; (4) patterns; (5) Part-NCO; (6) performance; (7) CS-23. (B) Understand the factors affecting asymmetric committal height/altitude (ACH/A).
ATTITUDE	(A) Situation awareness: recognise whether the approach profile is stabilised, leading to a safe asymmetric landing. (B) Effective communication: liaison with ATC. (C) Leadership and teamwork: demonstrate correct crew coordination (where applicable). (D) Effective workload management: apply appropriate abnormal procedures for asymmetric approach and landing. (E) Effective problem-solving and decision-making: make appropriate decision at asymmetric committal height (ACH) to commit to final flap selection and landing.

ATC liaison — compliance, RTF procedures

Module 4: Optional flight with one engine inoperative (multi-engine aeroplanes only) (must be performed by sole reference to instruments) (Multi-engine aeroplanes only)	
ATC liaison — compliance, RTF procedures	
OBJECTIVE	(A) Inform ATC of abnormal flight condition and any assistance required. (B) Comply with ATC procedures and instructions.
SKILL	(A) Use standard RTF phraseology when declaring an emergency. (B) Seek assistance as appropriate.
KNOWLEDGE	ICAO (English level 4, minimum) standard phraseology.
ATTITUDE	(A) Situation awareness: communicate with ATC that an emergency state has occurred. (B) Effective communication: read back correctly, in a timely manner, the ATC clearance in the sequence received. (C) Leadership and teamwork: demonstrate correct coordination (where applicable). (D) Effective workload management: copy correctly, in a timely manner, the ATC clearance as issued. (E) Effective problem-solving and decision-making: interpret correctly the ATC clearance received and ensure to comply with aircraft in an asymmetric configuration.’

(3) New 'GM2 FCL.835 Module 1: Pre-flight operations and general handling' is inserted as follows:

'**GM2 FCL.835 Module 1: Pre-flight operations and general handling**

A comparison was conducted between the private pilot licence (PPL) syllabi for both UK alternative means of compliance (AltMoC 2015-00011) and AMC1 FCL.210 and the learning objectives for the competence-based modular instrument rating (CBM IR) (AMC2 FCL.615(b)) to identify areas of similarity and the depth of knowledge between the syllabi. The depth of knowledge is based on the following descriptors:

(a) **Level 1 (Basic)** means that the applicant has an understanding of the basic elements, concepts or principles of the subject and, where appropriate, understands simple terms. For example, can recall a simple fact or locate information on a table or graph.

(b) **Level 2 (Intermediate)** means that the applicant has a general knowledge of the theoretical and practical aspects of the subject and can apply that knowledge to a practical situation. For example, can apply a single rule, formula or piece of knowledge to a specific situation in order to determine the correct data, course of action or safe outcome.

(c) **Level 3 (Comprehensive)** means that the applicant has a detailed knowledge of the theoretical and practical aspects of the subject and the interrelationship with other subjects. For example, can analyse, compare or evaluate complex data in a variety of situations in order to complete accurately multi-step calculations, make correct decisions and comply with multiple rules or procedures.

The comparison identified learning objectives that were covered in the PPL syllabus and no further depth of knowledge was required for the issue of the basic instrument rating (BIR). These are indicated with a 'No' in the BIR syllabus column.

The comparison identified learning objectives that were covered in the PPL syllabus but further depth of knowledge was required for the issue of the BIR. These are indicated with a 'Yes' in the BIR syllabus column.

The comparison identified learning objectives that were not covered in the PPL syllabus but were considered necessary for the issue of the BIR. These are indicated with a 'Yes' in the BIR syllabus column.

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
010 00 00 00	**AIR LAW**				
010 04 00 00	**PERSONNEL LICENSING**				
010 04 02 00	**Aircrew Regulation — 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.	Yes	2	2	No
010 04 02 02	**Part-FCL**				
LO	Name the content of PART-FCL.	Yes	2	2	No
010 04 02 05	**Ratings**				
LO	Explain the requirements for validity and privileges of instrument ratings (IRs).			3	Yes
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.			3	Yes
010 05 03 00	**General rules**				
LO	Describe the requirements when conducting simulated instrument flights.			2	Yes
LO	Explain why a time check has to be performed before			1	Yes

	flight.				
LO	Describe the required actions to be carried out if the continuation of a controlled VFR flight in VMC is not practicable anymore.	Yes	2	3	Yes
LO	Describe the provisions for transmitting a position report to the appropriate ATS unit including time of transmission and normal content of the message.	Yes	2	3	Yes
LO	Describe the necessary action when an aircraft is experiencing a COM failure.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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 operating principle of a: — static source, — pitot tube, and — combined pitot/static probe.	Yes	2	3	Yes
LO	For each of these indicate the various locations, and 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.	Yes	2	3	Yes
LO	Explain the purpose of heating and interpret the effect of heating on sensed pressure.			1	Yes
LO	List the affected instruments and explain the consequences for the pilot in case of a malfunction, including blockage and leakage.	Yes	2	3	Yes
LO	Describe alternate static sources and their effects when used.	Yes	1	3	Yes
022 02 04 00	**Altimeter**				

LO	Define the following terms: height, altitude, indicated altitude, true altitude, pressure altitude, density altitude.	Yes	1	2	Yes
LO	Define the following barometric references: QNH, QFE, 1013,25 hPa.	Yes	3	3	
LO	Explain the operating principles of an altimeter.	Yes	2	2	No
LO	Describe and compare the following three types of altimeters: simple altimeter (single capsule), sensitive altimeter (multi-capsule), servo-assisted altimeter.	Yes	1	2	Yes
LO	Give examples of associated displays: pointer, multi-pointer, drum, vertical straight scale.	Yes	1	1	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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 to correct them.	Yes	2	2	No
LO	Give examples of altimeter correction tables from an aircraft operations manual (AOM)	Yes	1	1	No
LO	Describe the effects of a blockage or a leakage on the static pressure line.	Yes	2	3	Yes
022 02 05 00	**Vertical speed indicator (VSI)**				
LO	Explain the operating principles of a VSI.	Yes	1	2	Yes
LO	Describe and compare the following two types of VSIs: — barometric type, and — inertial type (inertial information provided by an inertial reference unit).	Yes	1	2	Yes
LO	Describe the following VSI errors: — pitot/static system errors, and — time lag, and the means to correct them.	Yes	2	3	Yes
LO	Describe the effects on a VSI of a blockage or a leakage in the static pressure line.	Yes	2	3	Yes
022 02 06 00	**Airspeed indicator (ASI)**				
LO	Define IAS, CAS, EAS, and TAS, and state and explain the	Yes	1	1	No

	relationship between these speeds.				
LO	Describe the following ASI errors and state when they must be considered: — pitot/static system errors, — compressibility error, — density error.	Yes	2	2	No
LO	Explain the operating principles of an ASI (as appropriate to aeroplanes or helicopters).	Yes	2	3	Yes
LO	Describe the effects on an ASI of a blockage or a leak in the static and/or total pressure line(s).	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
022 03 00 00	**MAGNETISM — DIRECT-READING COMPASS AND FLUX VALVE**				Yes
022 04 00 00	**GYROSCOPIC INSTRUMENTS**				
022 04 01 00	**Gyroscope: basic principles**				
LO	Define a gyro.	Yes	2	2	No
LO	Explain the fundamentals of the theory of gyroscopic forces.	Yes	2	2	No
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).*	Yes	2	2	No
022 04 02 00	**Rate-of-turn indicator — Turn coordinator — Balance (slip) indicator**				
LO	Explain the purpose of a rate-of-turn and balance (slip) indicator.	Yes	2	3	Yes
LO	Define a rate-1 turn.	Yes	2	3	Yes
LO	Explain the relation between bank angle, rate of turn and TAS.		2	3	Yes
LO	Explain why the indication of a rate-of-turn indicator is only correct for one TAS and when turn is coordinated.		2	3	Yes
LO	Explain the purpose of a balance (slip) indicator.	Yes	2	3	Yes
LO	Describe the indications of a rate-of-turn and balance (slip) indicator during a balanced, slip or skid turn.	Yes	2	3	Yes
LO	Describe the construction and principles of operation of a turn coordinator (or turn and bank indicator).	Yes	2	3	Yes

LO	Compare the rate-of-turn indicator with the turn coordinator.	Yes	2	3	Yes
022 04 03 00	**Attitude indicator (artificial horizon)**				
LO	Explain the purpose of the attitude indicator.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe the different designs and principles of operation of attitude indicators (air-driven, electric).	Yes	2	3	Yes
LO	Describe the attitude display and instrument markings.	Yes	2	3	Yes
022 04 04 00	**Directional gyroscope**				
LO	Explain the purpose of the directional gyroscope.	Yes	2	3	Yes
LO	Describe the following two types of directional gyroscopes: — air-driven directional gyro, and — electric directional gyro.	Yes	2	3	Yes
022 04 06 00	**Solid-state attitude and heading reference system (AHRS)**				
LO	Describe the basic principle of a solid-state AHRS using a solid-state 3-axis rate sensor, 3-axis accelerometer and a 3-axis magnetometer.			2	Yes
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.	Yes	2	3	Yes
022 13 02 00	**Mechanical integrated instruments: attitude and director indicator (ADI) and horizontal situation indicator (HSI)**				

LO	Describe an ADI and an HSI.	Yes	2	3	Yes
LO	List all the information that can be displayed for either instruments.	Yes	2	3	Yes
022 13 03 00	**Electronic flight instrument systems (EFISs)**				
022 13 03 01	**Design, limitations**				

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	List and describe the different components of an EFIS.	Yes	2	3	Yes
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.	Yes	2	3	Yes
LO	List and describe the following information that can be displayed on the PFD unit of an aircraft: — flight mode annunciation, — basic T, — attitude, — IAS, — altitude, — heading/track indications, — vertical speed, — maximum airspeed warning, — selected airspeed, — speed trend vector,	Yes	2	3	Yes

	— 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)**				

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	State that an ND (or an EHSI) provides a mode-selectable colour flight navigation display.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
040 00 00 00	**HUMAN PERFORMANCE**				
040 01 00 03	**HUMAN FACTORS: BASIC CONCEPTS**				
040 01 03 00	**Flight safety concepts**				
LO	Explain and give examples of latent threats.	Yes	1	1	No
LO	Explain and give examples of environmental threats.	Yes	1	1	No
LO	Explain and give examples of organisational threats.	Yes	1	1	No
LO	Explain and give a definition of ‘error’ according to the Threat and Error Management (TEM) model in ICAO Annex 1.	Yes	1	1	No
LO	Give examples of different countermeasures which may be used in order to manage threats, errors and undesired aircraft states.	Yes	2	2	No
LO	Explain and give examples of procedural error.	Yes	2	2	No
040 01 04 00	**Safety culture**				
LO	Distinguish between ‘open cultures’ and ‘closed cultures’.	Yes	1	1	No
LO	Illustrate how safety culture is reflected in national culture.	Yes	1	1	No
LO	Explain James Reason’s ‘Swiss Cheese Model’.		1	1	No
LO	State important factors that promote a good safety culture.	Yes	1	1	No
LO	Distinguish between ‘just culture’ and ‘non-punitive culture’.	Yes	1	1	No

LO	Name five components which form safety culture (according to James Reason).		1	1	No
040 02 00 00	**BASIC AVIATION PHYSIOLOGY AND HEALTH MAINTENANCE**				
040 02 01 00	**Basics of flight physiology**				
040 02 01 02	**Respiratory and circulatory systems**				
LO	Define 'linear', 'angular' and 'radial acceleration'.	Yes	2	2	No
LO	Describe the effects of acceleration on the circulation and blood volume distribution.	Yes	2	2	No

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	List the factors determining the effects of acceleration on the human body.	Yes	2	2	No
LO	Describe the measures which may be taken to increase tolerance to positive acceleration.	Yes	2	2	No
LO	List the effects of positive acceleration with respect to type, sequence and the corresponding G-load.	Yes	2	2	No
040 02 02 00	**Man and environment: the sensory system**				
LO	List the different senses.	Yes	2	2	No
LO	State the multi-sensory nature of human perception.	Yes	2	2	No
040 02 02 04	**Equilibrium**				
	Functional anatomy	Yes			
LO	List the main elements of the vestibular apparatus.	Yes	2	3	Yes
LO	State the functions of the vestibular apparatus on the	Yes	2	3	Yes

	ground and in flight.				
LO	Distinguish between the component parts of the vestibular apparatus in the detection of linear and angular acceleration as well as on gravity.	Yes	2	3	Yes
LO	Explain how the semicircular canals are stimulated.	Yes	2	3	Yes
	Motion sickness	Yes	2	3	Yes
LO	Describe airsickness and its accompanying symptoms.	Yes	2	3	Yes
LO	List the causes of motion sickness.	Yes	2	3	Yes
LO	Describe the necessary actions to be taken to counteract the symptoms of motion sickness.	Yes	2	3	Yes
040 02 02 05	**Integration of sensory inputs**				
LO	State the interaction between vision, equilibrium, proprioception and hearing to obtain spatial orientation in flight.	Yes	2	3	Yes
LO	Define the term 'illusion'.	Yes	2	3	Yes

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
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.	Yes	2	3	Yes
LO	Relate these illusions to problems that may be experienced in flight and identify the danger attached to them.	Yes	2	3	Yes
LO	State the conditions which cause the 'black-hole effect'	Yes	2	3	Yes

	and 'empty-field myopia'.				
LO	Give examples of approach and landing illusions, state the danger involved, and give recommendations to avoid or counteract these problems.	Yes	2	3	Yes
LO	State the problems associated with flickering lights (strobe lights, anti-collision lights, etc.).	Yes	2	3	Yes
LO	Give examples of vestibular illusions such as somatogyral (the Leans), Coriolis, somatogravic and G-effect illusions.	Yes	2	3	Yes
LO	Relate the above-mentioned vestibular illusions to problems encountered in flight and state the dangers involved.	Yes	2	3	Yes
LO	List and describe the function of the proprioceptive senses ('seat-of-the-pants' sense).	Yes	2	3	Yes
LO	Relate illusions of the proprioceptive senses to the problems encountered during flight.	Yes	2	3	Yes
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.			3	Yes
LO	Differentiate between vertigo, Coriolis effect and spatial disorientation.	Yes	2	3	Yes

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	Explain the flicker effect (stroboscopic effect) and discuss the countermeasures.			3	Yes
LO	Explain how spatial disorientation can result from a mismatch in sensory input and information processing.			3	Yes

LO	List the measures to prevent and/or overcome spatial disorientation.			3	Yes
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'.	Yes	2	2	No
LO	List cues which indicate the loss of situation awareness and name the steps to regain it.	Yes	2	3	Yes
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.	Yes	2	3	Yes
LO	Define the term 'mental model' in relation to a surrounding complex situation.	Yes	2	3	Yes
LO	Describe the advantage/disadvantage of mental models.	Yes	2	3	Yes
LO	Explain the relationship between personal 'mental models' and the creation of cognitive illusions.	Yes	2	2	No
040 03 02 03	**Theory and models of human error**				
LO	Define the term 'error'.	Yes	1	2	Yes
LO	Explain the concept of the 'error chain'.	Yes	1	2	Yes
LO	Differentiate between an isolated error and an error chain.	Yes	1	2	Yes
LO	Distinguish between the main forms/types of errors (i.e. slips, faults, omissions and violations).	Yes	1	2	Yes
LO	Discuss the above errors and their relevance in flight.	Yes	1	2	Yes
LO	Distinguish between an active and a latent error, and give examples.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
040 03 03 04	**Error generation**				
LO	Distinguish between internal and external factors in error generation.	Yes	1	2	Yes
LO	Identify possible sources of internal error generation.	Yes	1	2	Yes
LO	Define and discuss the two errors associated with motor programmes.	Yes	1	2	Yes
LO	List the three main sources of external error generation in the cockpit.	Yes	1	2	Yes
LO	Give examples to illustrate the following factors in external error generation in the cockpit: — ergonomics, — economics, — social environment.	Yes	1	2	Yes
LO	Name the major goals in the design of human-centred man–machine interfaces.	Yes	1	2	Yes
LO	Define the term ‘error tolerance’.	Yes	1	2	Yes
LO	List (and describe) strategies which are used to reduce human error.	Yes	1	2	Yes
040 03 03 00	**Decision-making**				
040 03 03 01	**Decision-making concepts**				
LO	Define the term ‘deciding’ and ‘decision-making’.	Yes			
LO	Describe the major factors on which decision-making should be based during the course of a flight.	Yes	2	2	No

LO	Describe the main human attributes with regard to decision-making.	Yes	2	2	No
LO	Discuss the nature of bias and its influence on the decision-making process.	Yes	2	2	No
LO	Describe the main error sources and limits in an individual's decision-making mechanism.	Yes	2	2	No

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	State the factors upon which an individual's risk assessment is based.	Yes	2	2	No
LO	Explain the relationship between risk assessment, commitment and pressure of time on decision-making strategies.	Yes	2	2	No
LO	Describe the positive and negative influences exerted by other group members on an individual's decision-making process.	Yes	2	2	No
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,	Yes	2	2	No

	— review and feedback.				
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.	Yes	1	2	Yes
LO	Stress the overall importance of constantly and positively striving to monitor for errors and thereby maintaining situation awareness.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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).	Yes	2	2	No
LO	Name the three phases of GAS.	Yes	2	2	No
LO	Name the symptoms of stress relating to the different phases of GAS.	Yes	2	2	No
LO	Explain how stress is cumulative and how stress from one situation can be transferred to a different situation.	Yes	2	3	Yes
LO	Explain how successful completion of a stressful task will reduce the amount of stress experienced when a similar situation arises in the future.	Yes	2	3	Yes
LO	Describe the effect of human underload/overload on effectiveness in the cockpit.	Yes	2	3	Yes
LO	List sources and symptoms of human underload.	Yes	2	3	Yes
040 03 07 00	**Advanced cockpit automation**				
040 03 07 01	**Advantages and disadvantages**				
LO	Define and explain the basic concept of automation.	Yes		1	Yes
LO	List the advantages/disadvantages of automation in the cockpit in respect of level of vigilance, attention, workload, situation awareness and crew coordination.	Yes		1	Yes
LO	State the advantages and disadvantages of the two components of the man–machine system with regard to	Yes		1	Yes

	information input and processing, decision-making, and output activities.				
LO	Explain the 'ironies of automation'.	Yes		1	Yes
LO	Give examples of methods to overcome the disadvantages of automation.	Yes		1	Yes
040 03 07 02	**Automation complacency**				
LO	State the main weaknesses in the monitoring of automatic systems.	Yes		1	Yes

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	Explain the following terms in connection with automatic systems: — passive monitoring, — blinkered concentration, — confusion, — mode awareness.	Yes		1	Yes
LO	Give examples of actions which may be taken to counteract ineffective monitoring of automatic systems.	Yes		1	Yes
LO	Define 'complacency'.	Yes		1	Yes
040 03 07 03	**Working concepts**				
LO	Summarise how the negative effects of automation on pilots may be alleviated.	Yes		2	Yes
LO	Interpret the role of automation with respect to flight safety.	Yes		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
050 00 00 00	**METEOROLOGY**				
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/1 000 ft and actual values).	Yes	1	1	No
050 01 02 06	**Development of inversions, types of inversions**				
LO	Describe the development and types of inversions.	Yes	1	1	No
LO	Explain the characteristics of inversions and of an isothermal layer.	Yes	1	1	No
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.	Yes	1	2	Yes
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.	Yes	1	1	No
LO	Explain the cooling and warming of the air on the earth or	Yes	1	1	No

	sea surfaces.				
LO	Sketch the diurnal variation of the temperature of the air in relation to the radiation of the sun and of the earth.	Yes	1	1	No
LO	Describe qualitatively the influence of the clouds on the cooling and warming of the surface and the air near the earth's surface.	Yes	1	1	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Distinguish between the influence of low or high clouds, thick or thin clouds.		1	1	No
LO	Explain the influence of the wind on the cooling and warming of the air near the earth's surfaces.		1	1	No
050 01 03 00	**Atmospheric pressure**				
050 01 03 01	**Barometric pressure, isobars**				
LO	Define atmospheric pressure.	Yes	2	2	No
LO	List the units of measurement of the atmospheric pressure used in aviation (hPa, inches). *(Refer to 050 10 01 01)*	Yes	2	2	No
LO	Describe isobars on surface weather charts.	Yes	2	2	No
LO	Define high, low, trough, ridge, wedge, col.	Yes	2	2	No
050 01 03 02	**Pressure variation with height, contours (isohypses)**				
LO	Explain the pressure variation with height.	Yes	2	2	No
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 5 500 m/AMSL is 50 ft (15 m) per 1 hPa.*	Yes	2	2	No
LO	Describe and interpret contour lines (isohypses) on a constant pressure chart. *(Refer to 050 10 02 03)*	Yes	2	2	No
050 01 03 03	**Reduction of pressure to mean sea level, QFF**				

LO	Define QFF.	Yes	2	2	No
LO	Explain the reduction of measured pressure to mean sea level, QFF.	Yes	2	2	No
LO	Mention the use of QFF for surface weather charts.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	1	1	No
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.	Yes	1	2	Yes
LO	Describe the vertical variation of the air density in the atmosphere.	Yes	1	2	Yes
LO	Describe the effect of humidity changes on the density of air.	Yes	1	2	Yes
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.	Yes	1	2	Yes
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	Yes	1	2	Yes

	tropopause).				
LO	Calculate the standard temperature on the Celsius scale for a given flight level.	Yes	1	2	Yes
LO	Determine a standard temperature deviation by the difference between the given outside air temperature and the standard temperature.	Yes	1	2	Yes

<table>
<tr><th>Syllabus reference</th><th>Syllabus details and associated learning objectives from the CBM IR syllabus</th><th>Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)</th><th>Expected level of knowledge (PPL)</th><th>Expected level of knowledge (BIR)</th><th>BIR syllabus to be covered?</th></tr>
<tr><td>050 02 00 00</td><td>WIND</td><td></td><td></td><td></td><td></td></tr>
<tr><td>050 02 02 00</td><td>Primary cause of wind</td><td></td><td></td><td></td><td></td></tr>
<tr><td>050 02 02 02</td><td>Variation of wind in the friction layer</td><td></td><td></td><td></td><td></td></tr>
<tr><td>LO</td><td>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).</td><td>Yes</td><td>1</td><td>2</td><td>Yes</td></tr>
<tr><td>LO</td><td>Explain the relationship between isobars and wind (direction and speed).</td><td></td><td></td><td>2</td><td>Yes</td></tr>
<tr><td></td><td>
<table>
<tr><td>Type of landscape</td><td>Wind speed in friction layer in % of the geostrophic wind</td><td>The wind in the friction layer blows across the isobars towards the low pressure. Angle between wind direction and isobars</td></tr>
<tr><td>over water</td><td>ca 70 %</td><td>ca 10°</td></tr>
<tr><td>over land</td><td>ca 50 %</td><td>ca 30°</td></tr>
<tr><td colspan="3">WMO-NO. 266</td></tr>
</table>
</td><td></td><td></td><td></td><td></td></tr>
<tr><td>050 02 02 03</td><td>Effects of convergence and divergence</td><td></td><td></td><td></td><td></td></tr>
<tr><td>LO</td><td>Describe atmospheric convergence and divergence.</td><td></td><td></td><td>2</td><td>Yes</td></tr>
<tr><td>LO</td><td>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</td><td></td><td></td><td>2</td><td>Yes</td></tr>
</table>

	between upper-air conditions and surface pressure systems).				

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	2	2	No
LO	Describe and explain mountain and valley winds.	Yes	2	2	No
LO	Describe and explain the Venturi effect, convergence in valleys and mountain areas.	Yes	2	2	No
LO	Describe and explain land and sea breezes, sea-breeze front.	Yes	2	3	Yes
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.	Yes	2	2	No
LO	State the conditions necessary for the formation of mountain waves.	Yes	2	2	No
LO	Describe the structure and properties of mountain waves.	Yes	2	2	No
LO	Explain how mountain waves may be identified by their associated meteorological phenomena.	Yes	2	3	Yes
050 02 06 00	**Turbulence**				
050 02 06 01	**Description and types of turbulence**				

LO	Describe turbulence and gustiness.	Yes	2	2	No
LO	List common types of turbulence (convective, mechanical, orographic, frontal, clear-air turbulence).	Yes	2	2	No
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)*	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State where turbulence will normally be found (rough ground surfaces, relief, inversion layers, CB, TS zones, unstable layers).	Yes	2	2	No
050 03 00 00	**THERMODYNANICS**				
050 03 01 00	**Humidity**				
050 03 01 01	**Water vapour in the atmosphere**				
LO	Describe humid air.	Yes	1	1	No
LO	Describe the significance of water vapour in the atmosphere for meteorology.	Yes	1	1	No
LO	Indicate the sources of atmospheric humidity.	Yes	1	1	No
050 03 01 03	**Temperature, dew point, relative humidity**				
LO	Define dew point.	Yes	1	1	No
LO	Recognise the dew-point curve on a simplified diagram (temperature, pressure).	Yes	1	1	No
LO	Define relative humidity.	Yes	1	1	No
LO	Explain the factors influencing the relative humidity at constant pressure.	Yes	1	1	No
LO	Explain the diurnal variation of the relative humidity.	Yes	1	1	No
LO	Describe the relationship between relative humidity, the amount of water vapour and the temperature.	Yes	1	1	No
LO	Describe the relationship between temperature and dew point.	Yes	1	1	No

LO	Estimate the relative humidity of the air from the difference between dew point and temperature.	Yes	1	1	No
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.	Yes	1	2	Yes

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	Describe 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.	Yes	1	2	Yes
LO	Determine the cloud base and top in a simplified diagram (temperature, pressure, humidity).	Yes	1	2	Yes
LO	Explain the influence of relative humidity on the height of the cloud base.			2	Yes
LO	Illustrate in a thermodynamic diagram the meaning of convective temperature (temperature at which formation of cumulus starts).			2	Yes
LO	List cloud types typical for stable and unstable air conditions.			2	Yes
LO	Summarise the conditions for the dissipation of clouds.			1	Yes
050 04 01 02	**Cloud types and cloud classification**				
LO	Describe cloud types and cloud classification.	Yes	1	1	No

LO	Identify by shape cirriform, cumuliform and stratiform clouds.	Yes	2	2	No
LO	Identify by shape and typical level the 10 cloud types (genera).	Yes	2	2	No
LO	Describe and identify by shape and supplementary features the following species: castellanus, lenticularis, fractus, humilis, mediocris, congestus, calvus, capillatus and virga.	Yes	2	2	No
LO	Distinguish between low-, medium- and high-level clouds according to the WMO 'cloud etage' (including heights): — for mid latitudes, — for all latitudes.			2	Yes

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	Distinguish between ice clouds, mixed clouds and pure-water clouds.			2	Yes
050 04 01 03	**Influence of inversions on cloud development**				
LO	Explain the influence of inversions on vertical movements in the atmosphere.	Yes	1	2	Yes
LO	Explain the influence of an inversion on the formation of stratus clouds.	Yes	1	2	Yes
LO	Explain the influence of ground inversion on the formation of fog.	Yes	1	2	Yes
LO	Determine on a simplified diagram the top of a cumulus cloud caused by an inversion.	Yes	1	2	Yes
050 04 01 04	**Flying conditions in each cloud type**				

LO	Assess the 10 cloud types for icing and turbulence.	Yes	3	3	No
050 04 02 00	**Fog, mist, haze**				
050 04 02 01	**General aspects**				
LO	Define fog, mist and haze with reference to the WMO standards of visibility range.	Yes	2	2	No
LO	Explain the formation of fog, mist and haze in general.	Yes	2	2	No
LO	Name the factors contributing in general to the formation of fog and mist.	Yes	2	2	No
LO	Name the factors contributing to the formation of haze.	Yes	2	2	No
LO	Describe freezing fog and ice fog.	Yes	2	2	No
050 04 02 02	**Radiation fog**				
LO	Explain the formation of radiation fog.	Yes	1	2	Yes
LO	Explain the conditions for the development of radiation fog.			2	Yes
LO	Describe the significant characteristics of radiation fog, and its vertical extent.			2	Yes

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	Summarise the conditions for the dissipation of radiation fog.			2	Yes
050 04 02 03	**Advection fog**				
LO	Explain the formation of advection fog.	Yes	1	2	Yes
LO	Explain the conditions for the development of advection fog.			2	Yes

LO	Describe the different possibilities of advection-fog formation (over land, sea and coastal regions).			2	Yes
LO	Describe the significant characteristics of advection fog.			2	Yes
LO	Summarise the conditions for the dissipation of advection fog.			2	Yes
050 04 02 04	**Steam fog**				
LO	Explain the formation of steam fog.	Yes	1	1	
LO	Explain the conditions for the development of steam fog.			1	Yes
LO	Describe the significant characteristics of steam fog.			1	Yes
LO	Summarise the conditions for the dissipation of steam fog.			1	Yes
050 04 02 05	**Frontal fog**				
LO	Explain the formation of frontal fog.	Yes	1	1	
LO	Explain the conditions for the development of frontal fog.			1	Yes
LO	Describe the significant characteristics of frontal fog.			1	Yes
LO	Summarise the conditions for the dissipation of frontal fog.			1	Yes
050 04 02 06	**Orographic fog (hill fog)**				
LO	Summarise the features of orographic fog.	Yes	1	2	
LO	Explain the conditions for the development of orographic fog.			2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe the significant characteristics of orographic fog.			2	Yes
LO	Summarise the conditions for the dissipation of orographic fog.			2	Yes
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:	Yes	1	1	
LO	— summarise the outlines of the ice crystal process (Wegener-Bergeron-Findeisen);			1	Yes
LO	— summarise the outlines of the coalescence process.			1	Yes
LO	Describe the atmospheric conditions that favour either process.			2	Yes
LO	Explain the development of snow, rain, drizzle and hail.			2	Yes
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).	Yes	3	3	No
LO	State the ICAO/WMO approximate diameters for cloud, drizzle and rain drops.			2	Yes
LO	State the approximate weights and diameters for			2	Yes

	hailstones.				
LO	Explain the mechanism for the formation of freezing precipitation.			2	Yes
LO	Describe the weather conditions that give rise to freezing precipitation.			2	Yes

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	Distinguish between the types of precipitation generated in convective and stratiform cloud.			2	Yes
LO	Assign typical precipitation types and intensities to different clouds.			2	Yes’

(4) New 'GM3 FCL.835 Module 2: Departure, precision (3D) approach procedures and non-precision (2D) approach procedures' is inserted as follows:

'**GM3 FCL.835 Module 2: Departure, precision (3D) approach procedures and non-precision (2D) approach procedures**

A comparison was conducted between the private pilot licence (PPL) syllabi for both UK alternative means of compliance (AltMoC 2015-00011) and AMC1 FCL.210 and the learning objectives for the competence-based modular instrument rating (CBM IR) (AMC2 FCL.615(b)) to identify areas of similarity and the depth of knowledge between the syllabi. The depth of knowledge is based on the following descriptors:

(a) **Level 1 (Basic)** means that the applicant has an understanding of the basic elements, concepts or principles of the subject and, where appropriate, understands simple terms. For example, can recall a simple fact or locate information on a table or graph.

(b) **Level 2 (Intermediate)** means that the applicant has a general knowledge of the theoretical and practical aspects of the subject and can apply that knowledge to a practical situation. For example, can apply a single rule, formula or piece of knowledge to a specific situation in order to determine the correct data, course of action or safe outcome.

(c) **Level 3 (Comprehensive)** means that the applicant has a detailed knowledge of the theoretical and practical aspects of the subject and the interrelationship with other subjects. For example, can analyse, compare or evaluate complex data in a variety of situations in order to complete accurately multi-step calculations, make safe decisions and comply with multiple rules or procedures.

The comparison identified learning objectives that were covered in the PPL syllabus and no further depth of knowledge was required for the issue of the basic instrument rating (BIR). These are indicated with a 'No' in the BIR syllabus column.

The comparison identified learning objectives that were covered in the PPL syllabus but further depth of knowledge was required for the issue of the BIR. These are indicated with a 'Yes' in the BIR syllabus column.

The comparison identified learning objectives that were not covered in the PPL syllabus but were considered necessary for the issue of the BIR. These are indicated with a 'Yes' in the BIR syllabus column.

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
010 00 00 00	**AIR LAW**				
010 06 00 00	**PROCEDURES FOR AIR NAVIGATION SERVICES — AIRCRAFT OPERATIONS (PANS-OPS)**				
010 06 03 00	**Departure procedures**				
010 06 03 01	**General criteria (assuming all engines operating)**				
LO	Name the factors dictating the design of instrument-departure procedures.	No		2	Yes
LO	Explain in which situations the criteria for omnidirectional departures are applied.	No		2	Yes
010 06 03 02	**Standard instrument departures (SIDs)**				
LO	Define the terms ‘straight departure’ and ‘turning departure’.	No		3	Yes
LO	State the responsibility of the operator when unable to utilise the published departure procedures.	No		3	Yes
010 06 03 03	**Omnidirectional departures**				
LO	Explain when the ‘omnidirectional method’ is used for departure.	No		2	Yes
LO	Describe the solutions when an omnidirectional procedure is not possible.	No		2	Yes
010 06 03 04	**Published information**				
LO	State the conditions for the publication of the SID and/or RNAV route.	No		2	Yes
LO	Describe how omnidirectional departures are expressed in the appropriate publication.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	No		2	Yes
010 06 04 00	**Approach procedures**				
010 06 04 01	**General criteria**				
LO	Name the five possible segments of an instrument approach procedure.	No		1	Yes
LO	Give reasons for establishing aircraft categories for the approach.	No		1	Yes
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'.	No		1	Yes
LO	State the minimum obstacle clearance provided by the minimum sector altitudes (MSAs) established for an aerodrome.	No		3	Yes
LO	Describe the point of origin, shape, size and subdivisions of the area used for MSAs.	No		3	Yes
LO	State that a pilot shall apply wind corrections when carrying out an instrument approach procedure.	No		1	Yes
LO	Name the most significant performance factor influencing the conduct of instrument approach procedures.	No		3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Explain why a pilot should not descend below OCA/Hs which are established for: — precision approach procedures, — non-precision approach procedures, — visual (circling) procedures.	No		3	Yes
LO	Describe, in general terms, the relevant factors for the calculation of operational minima.	No		3	Yes
LO	Translate the following abbreviations into plain language: DA, DH, OCA, OCH, MDA, MDH, MOC, DA/H, OCA/H, MDA/H.			1	Yes
LO	Explain the relationship between the terms: DA, DH, OCA, OCH, MDA, MDH, MOC, DA/H, OCA/H, MDA/H.	No		2	Yes
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.	No		2	Yes
LO	State within which area of the cross section the minimum obstacle clearance (MOC) is provided for the whole width of the area.	No		2	Yes
LO	Define the terms ‘IAF’, ‘IF’, ‘FAF’, ‘MAPt’ and ‘TP’.			1	Yes
LO	State the accuracy of facilities providing track (VOR, ILS, NDB).	No		1	Yes
LO	Describe the basic information relating to approach area splays.	No		1	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State the optimum descent gradient (preferred for a precision approach) in degrees and per cent.	No		1	Yes
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.	No		2	Yes
LO	Describe where an ARR route normally ends.	No		1	Yes
LO	State whether or not omnidirectional or sector arrivals can be provided.	No		2	Yes
LO	Explain the main task for the initial APP segment.	No		1	Yes
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.	No		3	Yes
LO	Describe the main task of the intermediate APP segment.			2	Yes
LO	State the main task of the final APP segment.	No		1	Yes
LO	Name the two possible aims of a final APP.	No		1	Yes
LO	Explain the term ‘final approach point’ in case of an ILS approach.	No		1	Yes
LO	State what happens if an ILS GP becomes inoperative during the APP.	No		3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
010 06 04 04	**Missed approach**				
LO	Name the three phases of a missed approach procedure and describe their geometric limits.	No		1	Yes
LO	Describe the main task of a missed approach procedure.	No		1	Yes
LO	State at which height/altitude the missed approach is assured to be initiated.	No		3	Yes
LO	Define the term 'missed approach point' (MAPt).	No		1	Yes
LO	Describe how an MAPt may be established in an approach procedure.	No		1	Yes
LO	State the pilot's reaction if, upon reaching the MAPt, the required visual reference is not established.	No		3	Yes
LO	Describe what a pilot is expected to do in the event a missed approach is initiated prior to arriving at the MAPt.	No		3	Yes
LO	State whether the pilot is obliged to cross the MAPt at the height/altitude required by the procedure or whether they are allowed to cross the MAPt at an altitude/height greater than that required by the procedure.	No		3	Yes
010 06 04 05	**Visual manoeuvring (circling) in the vicinity of the aerodrome**				

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe what is meant by 'visual manoeuvring (circling)'.	No		1	Yes
LO	Describe how a prominent obstacle in the visual manoeuvring (circling) area outside the final approach and missed approach area has to be considered for the visual circling.	No		2	Yes
LO	State for which category of aircraft the obstacle clearance altitude/height within an established visual manoeuvring (circling) area is determined.	No		2	Yes
LO	Describe how an MDA/H is specified for visual manoeuvring (circling) if the OCA /H is known.	No		2	Yes
LO	State the conditions to be fulfilled before descending below MDA/H in a visual manoeuvring (circling) approach.	No		3	Yes
LO	Describe why there can be no single procedure designed that will cater for conducting a circling approach in every situation.	No		3	Yes
LO	State how the pilot is expected to behave after initial visual contact during a visual manoeuvring (circling).	No		3	Yes
LO	Describe what the pilot is expected to do if visual reference is lost while circling to land from an instrument approach.	No		3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
010 06 04 06	**Area navigation (RNAV) approach procedures based on VOR/DME**				
LO	Describe the provisions that must be fulfilled before carrying out VOR/DME RNAV approaches.	No		2	Yes
LO	Explain the disadvantages of the VOR/DME RNAV system.	No		2	Yes
LO	List the factors which the navigational accuracy of the VOR/DME RNAV system depends on.	No		2	Yes
LO	State whether the VOR/DME/RNAV approach is a precision or a non-precision procedure.	No		1	Yes
010 06 05 00	**Holding procedures**				
010 06 05 01	**Entry and holding**				
LO	Explain why deviations from the in-flight procedures of a holding established in accordance with ICAO Doc 8168 are dangerous.	No		2	Yes
LO	State that if for any reasons a pilot is unable to conform to the procedures for normal conditions laid down for any particular holding pattern, they should advise ATC as early as possible.	No		2	Yes
LO	Describe how the right-turn holdings can be transferred to left-turn holding patterns.	No		2	Yes
LO	Describe the shape and terminology associated with the holding pattern.	No		1	Yes
LO	State the bank angle and rate of turn to be used whilst flying in a holding pattern.	No		1	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Explain why pilots in a holding pattern should attempt to maintain tracks and how this can be achieved.	No		2	Yes
LO	Describe where outbound timing begins in a holding pattern.	No		3	Yes
LO	State where the outbound leg in a holding pattern terminates if the outbound leg is based on DME.	No		3	Yes
LO	Describe the three heading-entry sectors for entries into a holding pattern.	No		1	Yes
LO	Define the terms ‘parallel entry’, ‘offset entry’ and ‘direct entry’.	No		1	Yes
LO	Determine the correct entry procedure for a given holding pattern.	No		3	Yes
LO	State the still-air time for flying the outbound entry heading with or without DME.	No		2	Yes
LO	Describe what the pilot is expected to do when clearance is received specifying the time of departure from the holding point.	No		3	Yes
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.	No		1	Yes
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.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
010 06 07 00	**Simultaneous operation on parallel or near-parallel instrument runways**				
LO	Describe the difference between independent and dependent parallel approaches.	No		1	Yes
LO	Describe the following different operations: — simultaneous instrument departures, — segregated parallel approaches/departures, — semi-mixed and mixed operations.	No		1	Yes
010 07 02 00	**ICAO Doc 4444 — Air Traffic Management**				
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.	No		1	Yes
LO	Indicate whether or not separation will be provided by ATC between an aircraft executing a visual approach and other arriving or departing aircraft.	No		2	Yes
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.	No		2	Yes
LO	Describe which flight level should be assigned to an aircraft first arriving over a holding fix for landing.	No		1	Yes
LO	Talk about the priority that will be given to aircraft for a landing.	No		1	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Understand the situation when a pilot of an aircraft in an approach sequence indicates their intention to hold for weather improvements.	No		3	Yes
LO	Explain the term 'expected approach time' and the procedures for its use.	No		2	Yes
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.	No		2	Yes
LO	Name the possible consequences for a PIC if the 'RWY-in-use' is not considered suitable for the operation involved.	No		3	Yes
010 07 02 14	**Miscellaneous separation procedures**				
LO	Be familiar with the separation of aircraft holding in flight.	Yes	1	2	Yes
LO	Be familiar with the minimum separation between departing aircraft.	Yes	1	2	Yes
LO	Be familiar with the minimum separation between departing and arriving aircraft.	Yes	1	2	Yes
LO	Be familiar with the non-radar wake turbulence longitudinal separation minima.	No		1	Yes
LO	Know about a clearance to 'maintain own separation' while in VMC.	Yes	1	2	Yes
LO	Give a brief description of 'essential traffic' and 'essential traffic information'.	No		1	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe the circumstances under which a reduction in separation minima may be allowed.	No		1	Yes
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.	No		2	Yes
LO	List the information to be transmitted to an aircraft at the commencement of final approach.	No		2	Yes
LO	List the information to be transmitted to an aircraft during final approach.	No		2	Yes
LO	State the sequence of priority between aircraft landing (or in the final stage of an approach to land) and aircraft intending to depart.	No		2	Yes
LO	Explain the factors that influence the approach sequence.	No		1	Yes
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.	No		2	Yes
LO	Describe what information shall be forwarded to a departing aircraft as far as visual or non-visual aids are concerned.	No		1	Yes
LO	State the significant changes that shall be transmitted as early as practicable to an arriving aircraft, particularly changes in the meteorological conditions.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	No		1	Yes
LO	List for which aircraft and their given positions or flight situations the TWR shall prevent collisions.	No		2	Yes
LO	Name the operational failure or irregularity of AD equipment which shall be reported to the TWR immediately.	No		1	Yes
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.	No		2	Yes
LO	Describe the procedures to be observed by the TWR whenever VFR operations are suspended.	No		2	Yes
010 07 02 17	**Radar services**				
LO	State to what extent the use of radar in air traffic services may be limited.	Yes	1	2	Yes
LO	State what radar-derived information shall be available for display to the controller as a minimum.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Name the two basic identification procedures used with radar.	Yes	1	2	Yes
LO	Define the term 'PSR'.	No		1	Yes
LO	Describe the circumstances under which an aircraft provided with radar services should be informed of its position.	Yes	1	2	Yes
LO	List the possible forms of position information passed to the aircraft by radar services.	Yes	2	3	Yes
LO	Define the term 'radar vectoring'.	Yes	1	1	No
LO	State the aims of radar vectoring as shown in ICAO Doc 4444.	Yes	1	1	No
LO	State how radar vectoring shall be achieved.	Yes	1	1	No
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.	Yes	2	3	Yes
LO	Explain the procedures for the conduct of surveillance radar approaches (SRAs).	Yes	2	3	Yes
LO	Describe what kind of action (concerning the transponder) the pilot is expected to perform in case of emergency if they have previously been directed by ATC to operate the transponder on a specific code.	Yes	3	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	2	3	Yes
010 08 04 01	**Aeronautical information publications (AIPs)**				
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	Yes	2	3	Yes

	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.				
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.	Yes	2	2	No
LO	Summarise the essential information which leads to the issuing of a NOTAM.	No	2	2	No
LO	Explain how information regarding snow, ice and standing water on AD pavements shall be reported.	No	2	3	Yes
010 08 04 03	**Aeronautical information regulation and control (AIRAC)**				
LO	List the circumstances whose information concerned shall or should be distributed as AIRAC.	Yes	1	1	No
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.	Yes	1	1	No
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.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
010 09 00 00	**AERODROMES** **(ICAO Annex 14 Volume I, Aerodromes — 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.	Yes	1	1	No
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.	Yes	2	2	No
010 09 03 02	**Runway strips**				
LO	Explain the term ‘runway strip’.	Yes	2	2	No
010 09 03 03	**Runway end safety area**				
LO	Explain the term ‘RWY end safety area’.	Yes	2	2	No
010 09 03 04	**Clearway**				
LO	Explain the term ‘clearway’.	Yes	2	2	No
010 09 03 05	**Stopway**				
LO	Explain the term ‘stopway’.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
010 09 03 07	**Taxiways**				
LO	Describe where runway-holding positions shall be established.	Yes	2	2	No
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).	Yes	1	2	Yes
LO	Describe the application and characteristics of: — RWY centre line markings, — THR marking.	Yes	1	2	Yes
010 09 04 03	**Lights**				
LO	Describe the mechanical safety considerations regarding elevated approach lights and elevated RWY, stopway and taxiway lights.	No		2	Yes
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.	No		2	Yes
LO	List the conditions for the installation of an AD beacon and describe its general characteristics.	Yes	1	2	Yes
LO	Name the different kinds of operations for which a simple APP lighting system shall be used.	No		3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe the basic installations of a simple APP lighting system including the dimensions and distances normally used.	No		1	Yes
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.*	No		2	Yes
LO	Describe the wing bars of PAPI and APAPI.	Yes	2	2	No
LO	Interpret what the pilot will see, during approach, using PAPI, APAPI, T-VASIS and ATVASIS.	Yes	2	3	Yes
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, — SWY lights, — TWY-centre-line lights, — TWY-edge lights, — stop bars, — intermediate holding position lights, — RWY-guard lights, — road holding position lights.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
010 09 04 04	**Signs**				
LO	State the general purpose for installing signs.	Yes	1	1	No
LO	Explain what signs are the only ones on the movement area utilising red.	No	1	2	Yes
LO	List the provisions for illuminating signs.	No	1	2	Yes
LO	State the purpose for installing mandatory instruction signs.	No	1	2	Yes
LO	Name the kind of signs which shall be included in the mandatory instruction signs.	No	1	2	Yes
LO	Name the colours used for mandatory instruction signs.	No	1	1	No
LO	Describe the location of: — a RWY designation sign at a taxiway/RWY intersection; — a 'NO ENTRY' sign; — a RWY holding position sign.	No	1	2	Yes
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).	No	2	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe the various possible inscriptions on RWY designation signs and on holding position signs.	Yes	1	2	Yes
LO	Describe the inscription on an intermediate holding position sign on a taxiway.	Yes	1	2	Yes
010 09 08 00	**Attachment A to ICAO Annex 14, Volume I — Supplementary Guidance Material**				
010 09 08 03	**Approach lighting systems**				
LO	Name the two main groups of approach lighting systems.	No		2	Yes
LO	Describe the two different versions of a simple approach lighting system.	No		2	Yes
LO	Describe the two different basic versions of precision approach lighting systems for CAT I.	No		2	Yes
LO	Describe how the arrangement of an approach lighting system and the location of the appropriate threshold are interrelated.	No		3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
033 00 00 00	**FLIGHT PLANNING AND MONITORING**				
033 02 00 00	**FLIGHT PLANNING FOR IFR FLIGHTS**				
033 02 01 00	**IFR navigation plan**				
033 02 01 04	**Standard instrument departures (SIDs) and standard arrival routes (STARs)**				
LO	Explain the reasons for studying SID and STAR charts.	No		2	Yes
LO	State the reasons why the SID and STAR charts show procedures only in a pictorial presentation style which is not to scale.	No		2	Yes
LO	Interpret all data and information represented on SID and STAR charts, particularly: — routings, — distances, — courses, — radials, — altitudes/levels, — frequencies, — restrictions.	No		2	Yes
LO	Identify SIDs and STARs which might be relevant to a planned flight.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
033 02 01 05	**Instrument approach charts**				
LO	State the reasons for being familiar with instrument approach procedures and appropriate data for departure, destination and alternate airfields.	No		2	Yes
LO	Select instrument approach procedures appropriate for departure, destination and alternate airfields.	No		2	Yes
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.	No		3	Yes
033 02 01 06	**Communications and radio-navigation planning data**				

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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).	Yes	2	3	Yes
LO	Find the frequency and/or identifiers of radio-navigation aids.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
050 00 00 00	**METEOROLOGY**				
050 10 00 00	**METEOROLOGICAL INFORMATION**				
050 10 01 00	**Observation**				
050 10 01 01	**Surface observations**				
LO	Define visibility.	Yes	1	1	No
LO	Describe the meteorological measurement of visibility.	Yes	1	1	No
LO	Define prevailing visibility.	Yes	1	2	Yes
LO	Define ground visibility.	Yes	1	2	Yes
LO	List the units used for visibility (m, km).	Yes	1	1	No
LO	Define runway visual range.	Yes	1	2	Yes
LO	Describe the meteorological measurement of runway visual range.	Yes	1	2	Yes
LO	Indicate where the transmissometers/forward-scatter meters are placed on the airport.	Yes	1	2	Yes
LO	List the units used for runway visual range (m).	Yes	1	1	No
LO	List the different possibilities to transmit information about runway visual range to pilots.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Compare visibility and runway visual range.	Yes	1	2	Yes
LO	List the clouds considered in meteorological reports, and how they are indicated in METARs (TCU, CB).	Yes	1	2	Yes
LO	Define oktas.	Yes	1	1	No
LO	Define cloud base.	Yes	1	1	No
LO	Define ceiling.	Yes	1	1	No
LO	Name the unit and the reference level used for information about cloud base (ft).	Yes	1	1	No
LO	Define vertical visibility.	Yes	1	1	No
LO	Explain briefly how and when the vertical visibility is measured.	Yes	1	2	Yes
LO	Name the unit used for vertical visibility (ft).	Yes	1	1	No
050 10 01 04	**Weather radar observations**				
LO	Interpret ground weather radar images.	Yes	1	2	Yes
LO	Describe the basic principle and the type of information given by airborne weather radar (AWR).	Yes	1	2	Yes
LO	Describe the limits and the errors of AWR information.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Interpret typical AWR images.	No		2	Yes
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).	Yes	2	3	Yes
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.	Yes	2	3	Yes
050 10 02 02	**Surface charts**				
LO	Recognise the following weather systems on a surface weather chart (analysed and forecast): ridges, cols and troughs; fronts; frontal side, warm sector and rear-side of mid-latitude frontal lows; high- and low-pressure areas.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
062 00 00 00	**RADIO NAVIGATION**				
062 02 00 00	**RADIO AIDS**				
062 02 01 00	**Ground direction finding**				
062 02 01 03	**Coverage and range**				
LO	Use the formula: 1.23 × √transmitter height in ft + 1.23 × √receiver height in ft to calculate the range in NM.	Yes	2	2	No
062 02 02 00	**Non-directional beacon (NDB)/automatic direction finder (ADF)**				
062 02 02 01	**Principles**				
LO	Define the abbreviation ‘NDB’.	Yes	1	1	No
LO	Define the abbreviation ‘ADF’.	Yes	1	1	No
LO	State that the NDB is the ground part of the system.	Yes	1	1	No
LO	State that the ADF is the airborne part of the system.	Yes	1	1	No
LO	State that NDB operates in the LF and MF frequency bands.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	The frequency band assigned to aeronautical NDBs according to ICAO Annex 10 is 190–1 750 kHz.	Yes	1	2	Yes
LO	Define a locator beacon. An LF/MF NDB used as an aid to final approach usually with a range, according to ICAO Annex 10, of 10–25 NM.	Yes	1	2	Yes
LO	Explain the difference between NDBs and locator beacons.	Yes	1	2	Yes
LO	Explain which beacons transmit signals suitable for use by an ADF.	Yes	1	2	Yes
LO	State that certain commercial radio stations transmit within the frequency band of the NDB.	Yes	1	1	No
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.	Yes	1	2	Yes
LO	Describe the use of NDBs for navigation.	Yes	2	3	Yes
LO	Describe the procedure to identify an NDB station.	Yes	2	3	Yes
LO	Interpret the term ‘cone of silence’ in respect of an NDB.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State that an NDB station emits a NON/A1A or a NON/A2A signal.	Yes	1	2	Yes
LO	State the function of the beat frequency oscillator (BFO).	Yes	1	2	Yes

LO	State that in order to identify a NON/A1A NDB, the BFO circuit of the receiver has to be activated.	Yes	1	2	Yes
LO	State that the NDB emitting NON/A1A gives rise to erratic indications of the bearing while the station is identifying.	Yes	1	2	Yes
LO	Explain that on modern aircraft the BFO is activated automatically.	Yes	1	2	Yes
062 02 02 02	**Presentation and interpretation**				
LO	Name the types of indicators in common use: — electronic navigation display, — radio magnetic indicator (RMI), — fixed card ADF (radio compass), — moving card ADF.	Yes	1	2	Yes
LO	Describe the indications given on RMI, fixed card and moving card ADF displays.	Yes	1	2	Yes
LO	Given a display, interpret the relevant ADF information.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Calculate the true bearing from the compass heading and relative bearing.	Yes	2	3	Yes
LO	Convert the compass bearing into magnetic bearing and true bearing.	Yes	2	3	Yes
LO	Describe how to fly the following in-flight ADF procedures according to ICAO Doc 8168 'Aircraft Operations' Vol. I 'Flight Procedures': — homing and tracking, and explain the influence of wind; — interceptions; — procedural turns; — holding patterns.	Yes	2	3	Yes
062 02 02 03	**Coverage and range**				
LO	State that the power limits the range of an NDB.	Yes	1	1	No
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.	Yes	1	2	Yes
LO	Describe the propagation path of NDB radio waves with respect to the ionosphere and the earth's surface.	Yes	1	2	Yes
LO	Explain that interference between sky and ground waves at night leads to 'fading'.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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°.	Yes	2	3	Yes
LO	State that there is no warning indication of NDB failure.	Yes	2	3	Yes
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.	Yes	1	2	Yes
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.	Yes	1	2	Yes
LO	State that interference from other NDB stations on the same frequency may occur at night due to sky wave contamination.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	1	2	Yes
LO	State that coastal refraction error increases with increased incidence.	Yes	1	2	Yes
LO	State that night effect predominates around dusk and dawn.	Yes	1	2	Yes
LO	Define multipath propagation of the radio wave (mountain effect).	Yes	1	2	Yes
LO	State that static emission energy from a cumulonimbus cloud may interfere with the radio wave and influence the ADF bearing indication.	Yes	1	2	Yes
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.	Yes	1	2	Yes
LO	State that frequencies within the allocated VOR range, which have an odd number in the first decimal place, are used by ILS.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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; — 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.	Yes	1	2	Yes
LO	Describe how ATIS information is transmitted on VOR frequencies.	Yes	1	2	Yes
LO	List the three main components of VOR airborne equipment: — the antenna, — the receiver, and — the indicator.	Yes	1	1	Yes
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.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	1	2	Yes
062 02 03 02	**Presentation and interpretation**				
LO	Read off the radial on a radio magnetic indicator (RMI).	Yes	1	2	Yes
LO	Read off the angular displacement in relation to a preselected radial on an HSI or CDI.	Yes	1	2	Yes
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.	Yes	1	1	No
LO	Interpret VOR information as displayed on HSI, CDI and RMI.	Yes	2	3	Yes
LO	Describe the following in-flight VOR procedures as in Doc 8168 Vol. I: — tracking and explain the influence of wind when tracking; — interceptions; — procedural turns; — holding patterns.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State that when converting a radial into a true bearing, the variation at the VOR station has to be taken into account.	Yes	2	3	Yes
062 02 03 03	**Coverage and range**				
LO	Calculate the range using the formula: 1.23 × √transmitter height in ft + 1.23 × √receiver height in ft.	Yes	2	2	No
062 02 03 04	**Errors and accuracy**				
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.	Yes	2	3	Yes
LO	State that due to reflections from terrain, radials can be bent and lead to wrong or fluctuating indications which is called 'scalloping'.	Yes	2	3	Yes
062 02 04 00	**Distance-measuring equipment (DME)**				
062 02 04 01	**Principles**				
LO	State that the DME operates in the UHF band between 960–1 215 MHz according to ICAO Annex 10.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State that the system comprises two basic components: — the aircraft component, the interrogator; and — the ground component, the transponder.	Yes	1	1	No
LO	State that the distance measured by DME is slant range.	Yes	1	2	Yes
LO	Illustrate that a position line using DME is a circle with the station at its centre.	Yes	1	2	Yes
LO	Describe how the pairing of VHF and UHF frequencies (VOR/DME) enables the selection of two items of navigation information from one frequency setting.	Yes	1	1	No
LO	Describe, in the case of co-location, the frequency pairing and identification procedure.	Yes	2	3	Yes
LO	Explain that depending on the configuration, the combination of a DME distance with a VOR radial can determine the position of the aircraft.	Yes	2	3	Yes
LO	Explain that military TACAN stations may be used for DME information.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	1	1	No
LO	Calculate ground distance given slant range and altitude.	Yes	2	3	Yes
LO	Describe the use of DME to fly a DME arc in accordance with Doc 8168 Vol. I.	Yes	2	3	Yes
LO	State that a DME system may have a ground speed read-out combined with the DME read-out.	Yes	2	3	Yes
062 02 04 03	**Coverage and range**				
LO	Explain why a ground station can generally respond to a maximum of 100 aircraft.	Yes	1	2	Yes
LO	Explain which aircraft will be denied a DME range first when more than 100 interrogations are being made.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
060 02 04 05	**Factors affecting range and accuracy**				
LO	State that the ground speed read-out combined with DME is only correct when tracking directly to or from the DME station.	Yes	1	2	Yes
LO	State that, close to the station, the ground speed read-out combined with DME is less than the actual ground speed.	Yes	1	2	Yes
062 02 05 00	**Instrument landing system (ILS)**				
062 02 05 01	**Principles**				
LO	Name the three main components of an ILS: — the localiser (LOC), — the glide path (GP), and — range information (markers or DME).	No		2	Yes
LO	State the site locations of the ILS components: — The LOC 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.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Explain that marker beacons produce radiation patterns to indicate predetermined distances from the threshold along the ILS glide path.	No		2	Yes
LO	Explain that marker beacons are sometimes replaced by a DME paired with the LOC frequency.	No		2	Yes
LO	State that in the ILS frequency assigned band 108,0–111,975 MHz, only frequencies with the first decimal odd are ILS frequencies.	No		2	Yes
LO	State that the LOC operates in the VHF band 108,0–111,975 MHz according to ICAO Annex 10.	No		2	Yes
LO	State that the GP operates in the UHF band.	No		2	Yes
LO	State that both the LOC and the GP antenna radiate side lobes (false beams), which could give rise to false centre line and false glide path indication.	No		2	Yes
LO	Explain that the back beam from the LOC antenna may be used as a published ‘non-precision approach’.	No		3	Yes
LO	State that according to ICAO Annex 10 the nominal glide path is 3°.	No		3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	No		3	Yes
062 02 05 02	**Presentation and interpretation**				
LO	Describe the ILS identification regarding frequency and Morse code and/or plain text.	No		3	Yes
LO	Calculate the rate of descent for a 3° glide path angle given the ground speed of the aircraft using the formula: Rate of descent (ROD) in ft/min = ground speed in kt × 10 / 2	No		3	Yes
LO	Calculate the rate of descent using the following formula when flying any glide path angle: ROD ft/min = speed factor (SF) × glide path angle × 100	No		3	Yes
LO	Interpret the markers by sound, modulation, and frequency.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State that the outer marker cockpit indicator is coloured blue, the middle marker amber, and the inner marker white.	No		2	Yes
LO	State that a failure of either the LOC 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.	No		3	Yes
LO	State that an ILS receiver has an automatic monitoring function.	No		2	Yes
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.	No		3	Yes
LO	Interpret the aircraft's position in relation to the extended runway centre line on a back-beam approach.	No		3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Explain the setting of the course pointer of an HSI for front-beam and back-beam approaches.	No		3	Yes
062 02 05 03	**Coverage and range**				
LO	Sketch the standard coverage area of the LOC and GP with angular sector limits in degrees and distance limits from the transmitter in accordance with ICAO Annex 10: — LOC 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.	No		2	Yes
062 02 05 04	**Errors and accuracy**				
LO	Sketch the standard coverage area of the LOC and GP with angular sector limits in degrees and distance limits from the transmitter in accordance with ICAO Annex 10: — LOC 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.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Explain the following in accordance with ICAO Doc 8168: — The accuracy the pilot has to fly the ILS LOC 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 LOC 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.	No		3	Yes
LO	State that if a pilot deviates by more than half-scale deflection on the LOC 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.	No		3	Yes
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 (AWR).	Yes	1	2	Yes
LO	Describe the pulse technique and echo principle on which primary radar systems are based.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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: superrefraction and subrefraction; — attenuation with distance; — condition and size of the reflecting surface.	Yes	1	2	Yes
062 03 02 00	**Ground radar**				
062 03 02 01	**Principles**				
LO	Explain that primary radar provides bearing and distance of targets.	Yes	1	1	No
LO	Explain that primary ground radar is used to detect aircraft that are not equipped with a secondary radar transponder.	Yes	1	1	No
LO	Explain why moving target indicator (MTI) is used.	Yes	1	1	No
062 03 02 02	**Presentation and interpretation**				
LO	State that modern ATC systems use computer-generated display.	Yes	1	1	No
LO	Explain that the radar display enables the ATS controller to provide information, surveillance or guidance services.	Yes	1	1	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
062 03 03 00	**Airborne weather radar (AWR)**				
063 03 03 01	**Principles**				
LO	List the two main tasks of the weather radar in respect of weather and navigation.	No		1	Yes
LO	Explain how the antenna is attitude-stabilised in relation to the horizontal plane using the aircraft's attitude reference system.	No		1	Yes
LO	Describe the cone-shaped pencil beam of about 3 to 5° beam width used for weather depiction.	No		1	Yes
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.	No		1	Yes
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/autotilt switch.	No		2	Yes
LO	Name, for areas of differing reflection intensity, the colour gradations (green, yellow, red and magenta) indicating the increasing intensity of precipitation.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	No		2	Yes
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).	No		2	Yes
062 03 03 04	**Errors, accuracy and limitations**				
LO	Explain why AWR should be used with extreme caution when on the ground.	No		1	Yes
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.	No		2	Yes
LO	Explain why the tilt setting should be higher when the aircraft descends to a lower altitude.	No		2	Yes
LO	Explain why the tilt setting should be lower when the aircraft climbs to a higher altitude.	No		2	Yes
LO	Explain why a thunderstorm may not be detected when the tilt is set too high.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
062 03 03 06	**Application for navigation**				
LO	Describe the navigation function of the radar in the mapping mode.	No		2	Yes
LO	Describe the use of the weather radar to avoid a thunderstorm (Cb).	No		2	Yes
LO	Explain how turbulence (not CAT) can be detected by a modern weather radar.	No		2	Yes
LO	Explain how wind shear can be detected by a modern weather radar.	No		2	Yes
062 03 04 00	**Secondary surveillance radar and transponder**				
062 03 04 01	**Principles**				
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.	Yes	1	1	No
LO	Explain that the ground ATC secondary radar uses techniques which provide the ATC with information that cannot be acquired by the primary radar.	Yes	1	1	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	1	1	No
LO	Explain the advantages of SSR over a primary radar.	Yes	1	1	No
062 03 04 02	**Modes and codes**				
LO	Explain that the interrogator transmits its interrogations in the form of a series of pulses.	Yes	1	1	No
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.	Yes	3	3	No
LO	State that Mode A designation is a sequence of four digits that can be manually selected from 4 096 available codes.	Yes	3	3	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State that in Mode C reply the pressure altitude is reported in 100-ft increments.	Yes	3	3	No
LO	State that in addition to the information pulses provided, a special position identification (SPI) pulse can be transmitted but only as a result of a manual selection (IDENT).	Yes	3	3	No
LO	Explain the need for compatibility of Mode S with Mode A and C.	Yes	3	3	No
LO	Explain that Mode S transponders receive interrogations from other Mode S transponders and SSR ground stations.	Yes	2	2	No
LO	State that Mode S surveillance protocols implicitly use the principle of selective addressing.	Yes	2	2	No
LO	Explain that every aircraft will have been allocated an ICAO aircraft address which is hard-coded into the airframe (Mode S address).	Yes	2	2	No
LO	Interpret the following Mode S terms: — selective addressing, — mode ‘all call’, — selective call.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State that Mode S interrogation contains either: — aircraft address, — all-call address, — broadcast address.	Yes	2	3	Yes
LO	State that the aircraft address shall be transmitted in any reply except in Mode S 'only all-call' reply.	Yes	2	3	Yes
062 03 04 03	**Presentation and interpretation**				
LO	Explain how an aircraft can be identified by a unique code.	Yes	2	3	Yes
LO	Illustrate how the following information is presented on the radar screen: — pressure altitude, — flight level, — flight number or aircraft registration, — ground speed.	Yes	2	3	Yes
LO	Name and interpret the codes 7700, 7600 and 7500.	Yes	3	3	No
LO	Interpret the selector modes: OFF, Standby, ON (mode A), ALT (Mode A and C), and TEST.	Yes	3	3	No
LO	Explain the function of the emission of an SPI (special position identification) pulse after pushing the IDENT button in the aircraft.	Yes	3	3	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
	ELEMENTARY SURVEILLANCE				
LO	Explain that elementary surveillance provides the ATC controller with aircraft position, altitude and identification.	No		2	Yes
LO	State that elementary surveillance needs Mode S transponders with surveillance identifier (SI) code capacity and the automatic reporting of aircraft identification, known as ICAO Level 2s.	No		2	Yes
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.	No		2	Yes
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.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
062 05 00 00	**AREA NAVIGATION SYSTEMS, RNAV/FMS**				
062 0501 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.	No		1	Yes
LO	State that basic RNAV (B-RNAV) systems require RNP 5.	No		1	Yes
LO	State that precision RNAV (PRNAV) systems require RNP 1.	No		2	Yes
062 05 01 02	**Principles of 2D RNAV, 3D RNAV and 4D RNAV systems**				
LO	State that a 2D RNAV system is able to navigate in the horizontal plane only.	No		2	Yes
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.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	No		2	Yes
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 the airspace.	No		2	Yes
LO	The RNP type is based on the navigation performance accuracy to be achieved within the airspace.	No		2	Yes
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).	No		2	Yes
LO	State that RNAV equipment is one requirement in order to receive approval to operate in an RNP environment.	No		2	Yes
LO	State that RNAV equipment operates by automatically determining the aircraft position.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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 overflying 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.	No		2	Yes
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.	No		2	Yes
LO	State that airborne navigation equipment uses inputs from navigation systems such as VOR/DME, DME/DME, GNSS, INS and IRS.	No		2	Yes
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.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Indicate navigation equipment failure.	Yes	1	2	Yes
062 05 02 00	**Simple 2D RNAV**				
	Note 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) from 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.	Yes	2	2	No
LO	Track guidance is shown on the HSI/CDI.	Yes	1	2	Yes
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.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
062 05 02 03	**Navigation computer input/output**				
LO	State the following input data to the navigation computer: — actual VOR radial and DME distance from selected VOR station; — radial and distance to phantom waypoint; — desired magnetic track inbound to the phantom waypoint.	Yes	1	2	Yes
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°.	Yes	2	3	Yes
LO	State that the system is limited to operate within the range of the selected VOR/DME station.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
062 05 03 00	**4D RNAV**				
	Note The next generation of area navigation equipment allowed the flight crew to navigate on any desired track within coverage of VOR/DME stations.				
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;	No		2	Yes

	— 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; — indicate navigation equipment failure.				
062 05 04 00	**Flight management system (FMS) and general terms**				
062 05 04 03	**Navigation database**				
LO	State that the navigation database of the flight management computer (FMC) may contain the following data: — reference data for airports (4-letter ICAO identifier); — VOR/DME station data (3-letter ICAO identifier); — waypoint data (5-letter ICAO identifier); — STAR data; — SID data; — holding patterns; — airport runway data;	No		2	Yes

	— NDB stations (alphabetic ICAO identifier); — company flight plan routes.				
LO	State that the navigation database is updated every 28 days.	No		2	Yes
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-day navigational update of the database.	No		2	Yes
062 05 04 06	**Determination of the FMS position of the aircraft**				
LO	State that modern FMSs may use a range of sensors for calculating the position of the aircraft including VOR, DME, GPS, IRS and ILS.	No		1	Yes
062 06 00 00	**Global navigation satellite systems (GNSSs)**				
062 06 01 00	**GPS, GLONASS, GALILEO**				
062 06 01 01	**Principles**				
LO	State that there are two main GNSSs currently in existence, with a third one planned to be fully operational by 2011. These are: — USA NAVSTAR GPS (NAVigation System with Timing And Ranging Global Positioning System); — Russian GLONASS (GLObal NAvigation Satellite System); and — European GALILEO.	Yes	1	2	Yes
LO	State that all three systems (will) consist of a constellation of satellites, which can be used by a suitably equipped receiver to determine position.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
062 06 01 02	**Operation**				
	NAVSTAR GPS				
LO	State that there are currently two modes of operation: standard positioning service (SPS) for civilian users, and precise positioning service (PPS) for authorised users.	No		2	Yes
LO	SPS was originally designed to provide civil users with a less accurate positioning capability than PPS.	No		2	Yes
LO	Name the three segments as follows: — space segment, — control segment, — user segment.	No		2	Yes
	Space segment				
LO	State that the space segment consists of a notional constellation of 24 operational satellites.	Yes	1	2	Yes
LO	State that it takes 12 ½ minutes for a GPS receiver to receive all the data frames in the navigation message.	Yes	1	2	Yes
LO	State that the almanac contains the orbital data about all the satellites in the GPS constellation.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State that the ephemeris contains data used to correct the orbital data of the satellites due to small disturbances.	No		1	Yes
LO	State that the clock correction parameters are data for the correction of the satellite time.	Yes	1	2	Yes
LO	State that UTC parameters are factors determining the difference between GPS time and UTC.	Yes	1	2	Yes
LO	State that an ionospheric model is currently used to calculate the time delay of the signal travelling through the ionosphere.	No		1	Yes
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 navigation data.	No		2	Yes
LO	State that GPS uses the WGS-84 model.	Yes	1	1	No
LO	State that satellites are equipped with atomic clocks, which allow the system to keep very accurate time reference.	Yes	1	1	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
	Control segment				
LO	State that the control segment comprises: — a master control station; — ground antenna; — monitoring stations.	No		1	Yes
	User segment				
LO	State that GPS supplies three-dimensional position fixes and speed data, plus a precise time reference.	No		2	Yes
LO	State that the GPS receiver used in aviation is a multichannel type.	No		1	Yes
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 the satellite and the time of reception.	No		1	Yes
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.	No		2	Yes
LO	State that each range defines a sphere with its centre at the satellite.	No		1	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State that three satellites are needed to determine a two-dimensional position.	No		2	Yes
LO	State that four spheres are needed to calculate a three-dimensional position, hence four satellites are required.	No		2	Yes
LO	State that the GPS receiver is able to synchronise to the correct time base when receiving four satellites.	No		2	Yes
	NAVSTAR GPS integrity				
LO	Define 'receiver autonomous integrity monitoring' (RAIM). A technique whereby a receiver processor determines the integrity of the navigation signals.	No		2	Yes
LO	State that RAIM is achieved by consistency check among pseudo-range measurements.	No		2	Yes
LO	State that basic RAIM requires five satellites. A sixth is for isolating a faulty satellite from the navigation solution.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	No		2	Yes
062 06 02 00	**Ground-, satellite- and airborne-based augmentation systems**				
	Satellite-based augmentation systems (SBAS)				
LO	Explain the principle of an SBAS: to measure on the ground the signal errors transmitted by GNSS satellites and transmit differential corrections and integrity messages for navigation satellites.	No		2	Yes
LO	State that the frequency band of the data link is identical to that of the GPS signals.	No		2	Yes
LO	Explain that the use of geostationary satellites enables messages to be broadcast over very wide areas.	No		2	Yes
LO	Explain that pseudo-range measurements to these geostationary satellites can also be made as if they were GPS satellites.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State that SBAS consists of three elements: — the ground infrastructure (monitoring and processing stations); — the SBAS satellites; — the SBAS airborne receivers.	No		2	Yes
LO	Explain that SBAS can provide approach and landing operations with vertical guidance (APV) and precision approach service.	No		3	Yes
LO	Explain the difference between 'coverage area' and 'service area'.	No		2	Yes
LO	State that satellite-based augmentation systems include: — EGNOS in western Europe and the Mediterranean; — WAAS in the USA; — MSAS in Japan; and — GAGAN in India.	No		1	Yes
	European Geostationary Navigation Overlay Service (EGNOS)				
LO	State that EGNOS consists of three geostationary Inmarsat satellites which broadcast GPS-lookalike signals.	No		1	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State that EGNOS is designed to improve accuracy to 1–2 m horizontally and 3–5 m vertically.	No		2	Yes
LO	Explain that integrity and safety are improved by alerting users within 6 seconds if a GPS malfunction occurs (up to 3 hours GPS alone).	No		2	Yes
	Airborne-based augmentation systems (ABASs)				
LO	Explain the principle of ABASs: 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) in order to develop integrity control.	No		2	Yes
LO	State that the type of ABAS using only GNSS information is receiver autonomous integrity monitoring (RAIM).	No		2	Yes
LO	State that a system using information from additional on-board sensors is named aircraft autonomous integrity monitoring (AAIM).	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Explain that the typical sensors used are barometric altimeter, clock and inertial navigation system.	No		2	Yes
LO	Explain that unlike GBAS and SBAS, ABAS does not improve positioning accuracy.	No		2	Yes’

(5) New 'GM4 FCL.835 Module 3: En-route IFR procedures' is inserted as follows:

'**GM4 FCL.835 Module 3: En-route IFR procedures**

A comparison was conducted between the private pilot licence (PPL) syllabi for both UK alternative means of compliance (AltMoC 2015-00011) and AMC1 FCL.210 and the learning objectives for the competence-based modular instrument rating (CBM IR) (AMC2 FCL.615(b)) to identify areas of similarity and the depth of knowledge between the syllabi. The depth of knowledge is based on the following descriptors:

(a) **Level 1 (Basic)** means that the applicant has an understanding of the basic elements, concepts or principles of the subject and, where appropriate, understands simple terms. For example, can recall a simple fact or locate information on a table or graph.

(b) **Level 2 (Intermediate)** means that the applicant has a general knowledge of the theoretical and practical aspects of the subject and can apply that knowledge to a practical situation. For example, can apply a single rule, formula or piece of knowledge to a specific situation in order to determine the correct data, course of action or safe outcome.

(c) **Level 3 (Comprehensive)** means that the applicant has a detailed knowledge of the theoretical and practical aspects of the subject and the interrelationship with other subjects. For example, can analyse, compare or evaluate complex data in a variety of situations in order to complete accurately multi-step calculations, make correct decisions and comply with multiple rules or procedures.

The comparison identified learning objectives that were covered in the PPL syllabus and no further depth of knowledge was required for the issue of the basic instrument rating (BIR). These are indicated with a 'No' in the BIR syllabus column.

The comparison identified learning objectives that were covered in the PPL syllabus but further depth of knowledge was required for the issue of the BIR. These are indicated with a 'Yes' in the BIR syllabus column.

The comparison identified learning objectives that were not covered in the PPL syllabus but were considered necessary for the issue of the BIR. These are indicated with a 'Yes' in the BIR syllabus column.

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
010 00 00 00	**AIR LAW**				
010 05 00 00	**RULES OF THE AIR**				
010 05 02 00	**Applicability of the Rules of the Air**				
010 05 03 00	**General rules**				
LO	Describe the required actions to be carried out if the continuation of a controlled VFR flight in VMC is not practicable anymore.	Yes	3	3	No
LO	Describe the provisions for transmitting a position report to the appropriate ATS unit including time of transmission and normal content of the message.	Yes	2	3	Yes
LO	Describe the necessary action when an aircraft is experiencing a COM failure.	Yes	2	3	Yes
010 05 05 00	**Instrument flight rules (IFRs)**				
LO	Describe the IFRs as contained in Chapter 5 of ICAO Annex 2.	No		3	Yes
010 06 00 00	**PROCEDURES FOR AIR NAVIGATION SERVICES — AIRCRAFT OPERATIONS (PANS-OPS)**				
010 06 06 00	**Altimeter-setting procedures**				
010 06 06 01	**Basic requirements and procedures**				
LO	Describe the two main objectives of altimeter-setting.	Yes	2	3	Yes
LO	Define the terms ‘QNH’ and ‘QFE’.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe the different terms for 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.	Yes	2	3	Yes
LO	Define the term 'flight level' (FL).	Yes	2	3	Yes
LO	State where flight level zero shall be located.	Yes	2	2	No
LO	State the interval by which consecutive flight levels shall be separated.	Yes	1	2	Yes
LO	Describe how flight levels are numbered.	Yes	2	2	No
LO	Define the term 'transition altitude' (TA).	Yes	2	3	Yes
LO	State how TAs shall normally be specified.	Yes	1	3	Yes
LO	Explain how the height of the TA is calculated and expressed in practice.	Yes	1	2	Yes
LO	State where TAs shall be published.	Yes	1	2	Yes
LO	Define the term 'transition level' (TRL).	Yes	2	2	Yes
LO	State when the TRL is normally passed to aircraft.	No		2	Yes
LO	State how the vertical position of an aircraft shall be expressed at or below the TA and TRL.	Yes	1	2	Yes
LO	Define the term 'transition layer'.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	1	2	Yes
LO	State when the QNH altimeter setting shall be made available to departing aircraft.	Yes	1	2	Yes
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.	Yes	1	3	Yes
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.	Yes	1	3	Yes
LO	Describe why QNH altimeter-setting reports should be provided from sufficient locations.	Yes	1	3	Yes
LO	State how a QNH altimeter setting shall be made available to aircraft approaching a controlled aerodrome for landing.	Yes	2	3	Yes
LO	State under which circumstances the vertical position of an aircraft above the TRL may be referenced to altitudes.	No		2	Yes
010 06 06 02	**Procedures for operators and pilots**				
LO	State the three requirements that selected altitudes or selected flight levels selected should meet	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe a pre-flight operational test in case of QNH altimeter setting and in case of QFE altimeter setting including indication (error) tolerances referred to the different test ranges.	No		2	Yes
LO	State on which setting at least one altimeter shall be set prior to take-off.	Yes	1	2	Yes
LO	State where during the climb the altimeter setting shall be changed from QNH to 1013.2 hPa.	Yes	1	2	Yes
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.	Yes	2	2	No
LO	State the modes and codes that the pilot shall operate in the absence of any ATC directions or regional air navigation agreements.	Yes	1	1	No
LO	Indicate when the pilot shall operate in Mode S.	Yes	2	2	No
LO	State when the pilot shall 'SQUAWK IDENT'.	Yes	2	2	No
LO	State the transponder mode and code to indicate: — a state of emergency, — a communication failure, — unlawful interference.	Yes	2	2	No
LO	Describe the consequences of a transponder failure in flight.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	2	2	No
010 06 08 02	**Operation of ACAS equipment**				
LO	Describe the main reason for using ACAS.	No		2	Yes
010 07 00 00	**AIR TRAFFIC SERVICES (ATS) AND AIR TRAFFIC MANAGEMENT (ATM)**				
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.	Yes	2	3	Yes
010 07 01 04	**Air traffic control (ATC) services**				
LO	Name the ATS units providing ATC services (area control service, approach control service, aerodrome control service).	Yes	2	2	No
LO	Describe which unit(s) may be assigned with the task to provide specified services on the apron.	Yes	2	2	No
LO	Name the purpose of clearances issued by an ATC unit.	Yes	1	1	No
LO	Describe the aim of clearances issued by ATC with regard to IFR, VFR or special VFR flights, and refer to the different airspaces.	Yes	2	3	Yes
LO	List the various (five possible) parts of an ATC clearance.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State how ATC shall react when it becomes apparent that traffic, additional to that 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.	Yes	1	3	Yes
010 07 02 00	**ICAO Document 4444 — Air Traffic Management**				
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.	Yes	2	3	Yes
010 07 02 03	**ATS system capacity and air traffic flow management (ATFM)**				
LO	Explain when and where ATFM services shall be provided.	No		3	Yes
010 07 02 05	**ATC clearances**				
LO	Explain ‘the sole scope and purpose’ of an ATC clearance.	Yes	2	2	No
LO	State which information the issue of an ATC clearance is based on.	Yes	2	2	No
LO	Describe what a PIC should do if an ATC clearance is not suitable.	Yes	2	3	Yes
LO	Indicate who bears the responsibility for maintaining applicable rules and regulations whilst flying under the control of an ATC unit.	Yes	3	3	No
LO	Explain what is meant by the expression ‘clearance limit’.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	2	3	Yes
LO	List which items of an ATC clearance shall always be read back by the flight crew.	Yes	2	3	Yes
010 07 02 06	**Horizontal speed control instructions**				
LO	Explain the reason for speed control by ATC.	Yes	2	3	Yes
LO	Define the maximum speed changes that ATC may impose.	Yes	1	2	Yes
LO	State within which distance from the threshold the PIC must not expect any kind of speed control.	Yes	2	3	Yes
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.	No		2	Yes
LO	Indicate the expected reaction of the appropriate ATC unit upon a request to change from IFR to VFR.	No		2	Yes
010 07 02 09	**Altimeter-setting procedures**				
LO	Define the following terms: — TRL, — transition layer, — TA.	Yes	2	2	No
LO	Indicate how the vertical position of an aircraft in the vicinity of an aerodrome shall be expressed at or below the TA, at or above the TRL, and while climbing or descending through the	Yes	2	2	No

	transition layer.				
Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
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.	No		2	Yes
LO	Indicate how far altimeter settings provided to aircraft shall be rounded up or down.	No		1	Yes
LO	Define the expression 'lowest usable flight level'.	Yes	1	2	Yes
LO	Determine how the vertical position of an aircraft on an en-route flight is expressed at or above the lowest usable flight level and below the lowest usable flight level.	No		3	Yes
LO	State who establishes the TRL to be used in the vicinity of an aerodrome.	Yes	1	2	Yes
LO	Decide how and when a flight crew shall be informed about the TRL.	Yes	1	2	Yes
LO	State whether or not the pilot can request the TRL to be included in the approach clearance.	Yes	1	2	Yes
LO	State in what kind of clearance the QNH altimeter setting shall be included.	Yes	1	3	Yes
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.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	List the six items that are normally included in a voice position report.	Yes	1	2	Yes
LO	Name the requirements for using a simplified position report with flight level, next position (and time over) and ensuing significant points omitted.	Yes	2	2	No
LO	Name the item of a position report which must be forwarded to ATC with the initial call after changing to a new frequency.	Yes	1	2	Yes
LO	Indicate the item of a position report which may be omitted if SSR Mode C is used.	Yes	2	2	No
010 07 02 12	**Separation methods and minima**				
LO	Explain the general provisions for the separation of controlled traffic.	Yes	1	2	Yes
LO	Name the different kinds of separation used in aviation.	Yes	1	2	Yes
LO	Understand the difference between the type of separation provided within the various classes of airspace and between the various types of flight.	Yes	1	2	Yes
LO	State who is responsible for the avoidance of collision with other aircraft when operating in VMC.	Yes	1	2	Yes
LO	State the ICAO documents in which details of current separation minima are prescribed.	Yes	1	1	No
LO	Describe how vertical separation is obtained.	Yes	1	2	Yes
LO	State the required vertical separation minimum.	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe how the cruising levels of aircraft flying to the same destination and the expected approach sequence are correlated with each other.	Yes	1	2	Yes
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.	Yes	1	2	Yes
LO	List the two main methods for horizontal separation.	Yes	1	2	Yes
LO	Describe how lateral separation of aircraft at the same level may be obtained.	Yes	1	2	Yes
LO	Explain the term ‘geographical separation’.	No		2	Yes
LO	Describe track separation between aircraft using the same navigation aid or method.	Yes	1	2	Yes
LO	Describe the three basic means for the establishment of longitudinal separation.	Yes	1	2	Yes
LO	Describe the circumstances under which a reduction in separation minima may be allowed.	No		1	Yes
LO	Indicate the standard horizontal radar separation in NM.	No		1	Yes
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 (1 000 ft) below.	Yes	1	1	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
010 07 02 17	**Radar services**				
LO	State to what extent the use of radar in the provision of air traffic services may be limited.	Yes	1	1	No
LO	State what radar-derived information shall be available for display to the controller as a minimum.	Yes	1	1	No
LO	Name the two basic identification procedures used with radar.	Yes	1	1	No
LO	Define the term 'PSR'.	No		1	Yes
LO	Describe the circumstances under which an aircraft provided with radar services should be informed of its position.	Yes	1	1	No
LO	List the possible forms of position information passed to the aircraft by radar services.	Yes	1	1	No
LO	Define the term 'radar vectoring'.	Yes	1	1	No
LO	State the aims of radar vectoring as shown in ICAO Doc 4444.	No		1	Yes
LO	State how radar vectoring shall be achieved.	Yes	1	1	No
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.	Yes	1	2	Yes
LO	Explain the procedures for the conduct of surveillance radar approaches (SRAs).	Yes	1	2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe what kind of action (concerning the transponder) the pilot is expected to perform in case of emergency if they have previously been directed by ATC to operate the transponder on a specific code.	Yes	3	3	No
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.	Yes	3	3	No
LO	State the special rights an aircraft in a state of emergency can expect from ATC.	Yes	3	3	No
LO	Describe the expected action of aircraft after receiving a broadcast from ATS concerning the emergency descent of an aircraft.	Yes	2	3	Yes
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.	Yes	2	3	Yes
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.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State on which frequencies appropriate information, for an aircraft encountering two-way COM failure, will be sent by ATS.	Yes	2	3	Yes
LO	Describe the expected actions of an ATS unit after having learned that an aircraft is being intercepted in or outside its area of responsibility.	Yes	1	1	No
LO	State what is meant by the expression 'strayed aircraft' and 'unidentified aircraft'.	Yes	1	1	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	No		3	Yes
033 02 01 02	**Courses and distances from en-route charts**				
LO	Determine courses and distances.	No		3	Yes
LO	Determine bearings and distances of waypoints from radio-navigation aids.	No		3	Yes
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),	No		3	Yes

	— minimum crossing altitude (MCA), — minimum holding altitude (MHA).				

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
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).	No		3	Yes
033 02 01 06	**Communications and radio-navigation planning data**				
LO	Find the communication frequencies and call signs for the following: — control agencies and service facilities, — flight information services (FISs), — weather information stations, — automatic terminal information service (ATIS).	Yes	3	3	No
LO	Find the frequency and/or identifiers of radio-navigation aids.	Yes	3	3	No
033 02 01 07	**Completion of navigation plan**				
LO	Complete the navigation plan with the courses, distances and frequencies taken from charts.	Yes	3	3	No
LO	Find standard instrument departure (SID) and standard arrival routes (STARs) to be flown and/or to be expected.	No		3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Determine the position of top of climb (ToC) and top of descent (ToD) given appropriate data.	No		3	Yes
LO	Determine variation and calculate magnetic/true courses.	Yes	3	3	No
LO	Calculate true air speed (TAS) given aircraft performance data, altitude and outside air temperature (OAT).	Yes	3	3	No
LO	Calculate wind correction angles (WCA)/drift and ground speeds (GS).	Yes	3	3	No
LO	Determine all relevant altitudes/levels particularly MEA, MOCA, MORA , MAA, MCA, MRA and MSA.	No		3	Yes
LO	Calculate individual and accumulated times for each leg to destination and alternate airfields.	Yes	3	3	No
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.	Yes	3	3	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Determine relevant data from flight manual, such as fuel capacity, fuel flow/consumption at different power/thrust settings, altitudes and atmospheric conditions.	Yes	3	3	No
LO	Calculate attainable flight time/range given fuel flow/consumption and available amount of fuel.	Yes	3	3	No
LO	Calculate the required fuel given fuel flow/consumption and required time/range to be flown.	Yes	3	3	No
LO	Calculate the required fuel for an IFR flight given expected meteorological conditions and expected delays under defined conditions.	No		3	Yes
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.	Yes	3	3	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	2	3	Yes
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, danger areas and prohibited areas; — changes of frequencies for communications, navigation aids and facilities.	No		3	Yes
033 04 02 00	**Meteorological briefing**				
033 04 02 02	**Update of navigation plan using the latest meteorological information**				
LO	Confirm the optimum altitude/flight level given wind, temperature and aircraft data.	Yes	2	3	Yes
LO	Confirm magnetic headings and ground speeds.	Yes	3	3	No
LO	Confirm the individual leg times and the total time en-route.	Yes	3	3	No

LO	Confirm the total time en-route for the trip to the destination.	Yes	3	3	No
Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	Confirm the total time from destination to the alternate airfield.	Yes	3	3	No
033 04 02 05	**Update of fuel log**				
LO	Calculate revised fuel data in accordance with changed conditions.	Yes	3	3	No
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).	No		1	Yes
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);	Yes	2	3	Yes

	— other information (Item 18); — supplementary information (Item 19).				
Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
033 05 01 02	**Completion of an ATS flight plan (FPL)**				
LO	Complete the ATS FPL using information from the following: — navigation plan, — fuel plan, — operator's records for basic aircraft information.	Yes	2	3	Yes
033 05 03 00	**Submission of an ATS flight plan (FPL)**				
LO	Explain the requirements for the submission of an ATS FPL.	Yes	1	2	Yes
LO	Explain the actions to be taken in case of FPL changes.	Yes	2	3	Yes
LO	State the actions to be taken in case of inadvertent changes to track, TAS and time estimate affecting the current FPL.	Yes	2	3	Yes
LO	Explain the procedures for closing an FPL.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
050 00 00 00	**METEOROLOGY**				
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’.	Yes	1	1	No
LO	Describe the properties of the source regions.	Yes	1	1	No
LO	Summarise the classification of air masses by source regions.	Yes	1	1	No
LO	State the classifications of air masses by temperature and humidity at source.	Yes	1	1	No
LO	State the typical weather in each of the air masses.	Yes	2	2	No
LO	Name the three main air masses that affect Europe.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Classify air masses on a surface weather chart. *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).*	Yes	2	2	No
050 06 01 02	**Modification of air masses**				
LO	List the environmental factors that affect the final properties of an air mass.	Yes	2	2	No
LO	Explain how maritime and continental tracks modify air masses.	Yes	2	2	No
LO	Explain the effect of passage over cold or warm surfaces.	Yes	2	2	No
LO	Explain how air-mass weather is affected by the season, the air-mass track and by orographic and thermal effects over land.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in PPL syllabus (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Assess the tendencies of the stability for an air mass and describe the typical resulting air-mass weather including the hazards for aviation.	Yes	2	2	No
050 06 02 00	**Fronts**				
050 06 02 01	**General aspects**				
LO	Describe the boundaries between air masses (fronts).	Yes	1	1	No
LO	Define 'front' and 'frontal surface (frontal zone)'.	Yes	1	1	No
050 06 02 02	**Warm front, associated clouds and weather**				
LO	Define a 'warm front'.	Yes	1	1	No
LO	Describe the cloud, weather, ground visibility and aviation hazards at a warm front depending on the stability of the warm air.	Yes	2	3	Yes
LO	Explain the seasonal differences in the weather at warm fronts.	Yes	2	3	Yes
LO	Describe the structure, slope and dimensions of a warm front.	Yes	2	2	No
LO	Sketch a cross section of a warm front, showing weather, cloud and aviation hazards.	Yes	2	2	No
050 06 02 03	**Cold front, associated clouds and weather**				
LO	Define a 'cold front'.	Yes	1	1	No
LO	Describe the cloud, weather, ground visibility and aviation hazards at a cold front depending on the stability of the warm air.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Explain the seasonal differences in the weather at cold fronts.	Yes	2	3	Yes
LO	Describe the structure, slope and dimensions of a cold front.	Yes	2	2	No
LO	Sketch a cross section of a cold front, showing weather, cloud and aviation hazards.	Yes	2	2	No
050 06 02 04	**Warm sector, associated clouds and weather**				
LO	Define fronts and air masses associated with the warm sector.	Yes	1	1	No
LO	Describe the cloud, weather, ground visibility and aviation hazards in a warm sector.	Yes	2	3	Yes
LO	Explain the seasonal differences in the weather in a warm sector.	Yes	2	3	Yes
LO	Sketch a cross section of a warm sector, showing weather, cloud and aviation hazards.	Yes	2	2	No
050 06 02 05	**Weather behind the cold front**				
LO	Describe the cloud, weather, ground visibility and aviation hazards behind the cold front.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Explain the seasonal differences in the weather behind the cold front.	Yes	2	3	Yes
050 06 02 06	**Occlusions, associated clouds and weather**				
LO	Define the term 'occlusion'.	Yes	1	1	No
LO	Define a 'cold occlusion'.	Yes	1	1	No
LO	Define a 'warm occlusion'.	Yes	1	1	No
LO	Describe the cloud, weather, ground visibility and aviation hazards in a cold occlusion.	Yes	2	3	Yes
LO	Describe the cloud, weather, ground visibility and aviation hazards in a warm occlusion.	Yes	2	3	Yes
LO	Explain the seasonal differences in the weather at occlusions.	Yes	2	3	Yes
LO	Sketch a cross section of cold and warm occlusions, showing weather, cloud and aviation hazards.	Yes	2	2	No
LO	Illustrate in a sketch plan the development of an occlusion and the movement of the occlusion point.	Yes	2	2	No
050 06 02 07	**Stationary front, associated clouds and weather**				
LO	Define a 'stationary or quasi-stationary front'.	Yes	1	1	No
LO	Describe the cloud, weather, ground visibility and aviation hazards in a stationary or quasi-stationary front.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	1	1	No
LO	State the rules for predicting the direction and the speed of movement of fronts.	Yes	1	1	No
LO	Explain the difference between the speed of movement of cold and warm fronts.	Yes	2	2	No
LO	State the rules for predicting the direction and the speed of movement of frontal depressions.	Yes	2	2	No
LO	Describe, with a sketch if required, the genesis, development and life cycle of a frontal depression with associated cloud and rain belts.	Yes	2	2	No
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.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	1	1	No
LO	Describe the effect of high-level convergence in producing areas of high pressure at ground level.	Yes	2	2	No
LO	Describe air-mass subsidence, its effect on the environmental lapse rate, and the associated weather.	Yes	2	2	No
LO	Describe the formation of warm and cold anticyclones.	Yes	2	2	No
LO	Describe the formation of ridges and wedges. *(Refer to 050 08 03 02)*	Yes	2	2	No
LO	Describe the properties of and the weather associated with warm and cold anticyclones.	Yes	2	3	Yes
LO	Describe the properties of and the weather associated with ridges and wedges.	Yes	2	3	Yes
LO	Describe the blocking anticyclone and its effects.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
050 07 03 00	**Non-frontal depressions**				
050 07 03 01	**Thermal, orographic, polar and secondary depressions; troughs**				
LO	Describe the effect of high-level divergence in producing areas of low pressure at ground level.	Yes	2	2	No
LO	Describe the formation and properties of thermal, orographic (lee lows), polar and secondary depressions.	Yes	2	2	No
LO	Describe the formation, properties and associated weather of troughs.	Yes	2	2	No
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.	Yes	1	1	No
LO	Describe the typical weather in the region of the travelling polar front waves including the seasonal variations.	Yes	2	2	No
050 08 03 02	**High-pressure area**				
LO	Describe the high-pressure zones with the associated weather.	Yes	2	2	No
LO	Identify high-pressure regions on a weather chart.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe the weather associated with wedges in the polar air. *Refer to 050 07 02 01)*	Yes	2	2	No
050 08 03 03	**Flat-pressure pattern**				
LO	Identify on a surface weather chart the typical flat-pressure pattern.	Yes	2	2	No
LO	Describe the weather associated with a flat-pressure pattern.	Yes	2	2	No
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 (temperature of outside air; temperature of the airframe; presence of supercooled water in clouds, fog, rain and drizzle; possibility of sublimation).	Yes	2	3	Yes
LO	Indicate the general weather conditions under which ice accretion in Venturi carburettor occurs.	Yes	3	3	No
LO	Explain the general weather conditions under which ice accretion on airframe occurs.	Yes	2	3	Yes
LO	Explain the formation of supercooled water in clouds, rain and drizzle. *(Refer to 050 03 02 01)*	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Explain qualitatively the relationship between the air temperature and the amount of supercooled water.	Yes	2	3	Yes
LO	Explain qualitatively the relationship between the type of cloud and the size and number of the droplets in cumuliform and stratiform clouds.	Yes	2	3	Yes
LO	Indicate in which circumstances ice can form on an aircraft on the ground: air temperature, humidity, precipitation.	Yes	2	3	Yes
LO	Explain in which circumstances ice can form on an aircraft in flight: inside clouds, in precipitation, outside clouds and precipitation.	Yes	2	3	Yes
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.).	Yes	2	3	Yes
LO	Explain the effects of topography on icing.	Yes	2	3	Yes
LO	Explain the higher concentration of water drops in stratiform orographic clouds.	Yes	2	3	Yes
050 09 01 02	**Types of ice accretion**				
LO	Describe the aspect of ‘rime ice’: appearance, weight, solidity.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Define 'mixed ice'.	Yes	2	3	Yes
LO	Describe the conditions for the formation of mixed ice.	Yes	2	3	Yes
LO	Describe the aspect of mixed ice: appearance, weight, solidity.	Yes	2	3	Yes
LO	Describe the possible process of ice formation in snow conditions.	Yes	2	3	Yes
LO	Define 'hoar frost'.	Yes	2	3	Yes
LO	Describe the conditions for the formation of hoar frost.	Yes	2	3	Yes
LO	Describe the aspect of hoar frost: appearance, solidity.	Yes	2	3	Yes
050 09 01 03	**Hazards of ice accretion, avoidance**				
LO	State the ICAO qualifying terms for the intensity of icing. *(See ICAO Doc 4444 'Air Traffic Management')*	Yes	2	3	Yes
LO	Describe, in general, the hazards of icing.	Yes	2	3	Yes
LO	Assess the dangers of the different types of ice accretion.	Yes	2	3	Yes
LO	Describe the position of the dangerous zones of icing in fronts, in stratiform and cumuliform clouds, and in the different precipitation types.	Yes	2	3	Yes
LO	Indicate the possibilities of avoidance: — in the flight planning: weather briefing, choice of track and altitude; — during flight: recognition of the danger zones, choice of appropriate track and altitude.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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 Doc 4444 'Air Traffic Management')*	Yes	2	3	Yes
LO	Describe the effects of turbulence on an aircraft in flight.	Yes	2	3	Yes
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.	Yes	2	3	Yes
050 09 03 00	**Wind shear**				
050 09 03 01	**Definition of wind shear**				
LO	Define wind shear (vertical and horizontal).	Yes	2	3	Yes
LO	Define low-level wind shear.	Yes	2	3	Yes
050 09 03 02	**Weather conditions for wind shear**				
LO	Describe the conditions, where and how wind shear can form (e.g. thunderstorms, squall lines, fronts, inversions, land and sea breeze, friction layer, relief).	Yes	2	3	Yes
050 09 03 03	**Effects on flight, avoidance**				
LO	Describe the effects on flight caused by wind shear.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Indicate the possibilities of avoidance: — in the flight planning, — during flight.	Yes	2	3	Yes
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.	Yes	2	3	Yes
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).	Yes	2	3	Yes
050 09 04 02	**Structure of thunderstorms, life history**				
LO	Describe and sketch the stages of the life history of a thunderstorm: initial, mature and dissipating stage.	Yes	2	3	Yes
LO	Assess the average duration of thunderstorms and their different stages.	Yes	2	3	Yes
LO	Describe supercell storm: initial, supercell, tornado and dissipating stage.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Summarise the flight hazards of a fully developed thunderstorm.	Yes	2	3	Yes
LO	Indicate on a sketch the most dangerous zones in and around a thunderstorm.	Yes	2	3	Yes
050 09 04 03	**Electrical discharges**				
LO	Describe the basic outline of the electric field in the atmosphere.	Yes	2	3	Yes
LO	Describe the electrical potential differences in and around a thunderstorm.	Yes	2	3	Yes
LO	Describe and asses the 'St. Elmo's fire' weather phenomenon.	Yes	2	3	Yes
LO	Describe the development of lightning discharges.	Yes	2	3	Yes
LO	Describe the effect of lightning strike on aircraft and flight execution.	Yes	2	3	Yes
050 09 04 04	**Development and effects of downbursts**				
LO	Define the term 'downburst'.	Yes	2	3	Yes
LO	Distinguish between macroburst and microburst.	Yes	2	3	Yes
LO	State the weather situations leading to the formation of downbursts.	Yes	2	3	Yes
LO	Describe the process of development of a downburst.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Give the typical duration of a downburst.	Yes	2	3	Yes
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 (AWR) *(refer to 050 10 01 04),* use of the stormscope (lightning detector).	Yes	2	3	Yes
LO	Describe practical examples of flight techniques used to avoid the hazards of thunderstorms.	Yes	2	3	Yes
050 09 05 00	**Tornadoes**				
050 09 05 01	**Properties and occurrence**				
LO	Define ‘tornado’.	Yes	2	2	No
050 09 06 00	**Inversions**				
050 09 06 01	**Influence on aircraft performance**				
LO	Explain the influence of inversions on the aircraft performance.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	2	3	Yes
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.	Yes	2	3	Yes
LO	Describe the effects of the Foehn.	Yes	2	3	Yes
LO	Describe the influence of a mountainous area on a frontal passage.	Yes	2	3	Yes
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.	Yes	2	3	Yes
LO	Indicate in a sketch of a chain of mountains the turbulent zones (mountain waves, rotors).	Yes	2	3	Yes
LO	Explain the influence of relief on ice accretion.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
050 09 08 03	**Development and effect of valley inversions**				
LO	Describe the formation of valley inversion due to katabatic winds.	Yes	2	3	Yes
LO	Describe the valley inversion formed by warm winds aloft.	Yes	2	3	Yes
LO	Describe the effects of a valley inversion for an aircraft in flight.	Yes	2	3	Yes
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.	Yes	2	3	Yes
LO	Describe the reduction of visibility caused by obscurations: — fog, mist, haze, smoke, volcanic ash; — sand (SA), dust (DU).	Yes	2	3	Yes
LO	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.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
050 09 09 02	**Reduction of visibility caused by other phenomena**				
LO	Describe the reduction of visibility caused by: — low drifting and blowing snow; — low drifting and blowing dust and sand; — dust storm (DS) and sandstorm (SS); — icing (windshield); — the position of the sun relative to the visual direction; — the reflection of the sun's rays from the top of the layers of haze, fog and clouds.	Yes	2	3	Yes
050 10 00 00	**METEOROLOGICAL INFORMATION**				
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.	Yes	2	3	Yes

LO	Describe the general meaning of MET REPORT and SPECIAL REPORT.	Yes	2	3	Yes
LO	List, in general, the cases when a SIGMET and an AIRMET are issued.	Yes	2	3	Yes

Syllabus reference	**Syllabus details and associated learning objectives from the CBM IR syllabus**	**Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)**	**Expected level of knowledge (PPL)**	**Expected level of knowledge (BIR)**	**BIR syllabus to be covered?**
LO	Describe, decode (by using a code table) and interpret the following messages: runway state message (as written in a METAR), GAFOR. *Note: For runway state message and GAFOR, refer to ICAO Doc 7754 'Air Navigation Plans — European Region'.*	Yes	2	3	Yes
050 10 03 02	**Meteorological broadcasts for aviation**				
LO	Describe the meteorological content of broadcasts for aviation: — VOLMET, ATIS; — HF-VOLMET.	Yes	2	3	Yes
050 10 03 03	**Use of meteorological documents**				
LO	Describe meteorological briefing and advice.	Yes	2	3	Yes
LO	List the information that a flight crew can receive from meteorological services for pre-flight planning and apply the content of this information on a designated flight route.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	List the meteorological information that a flight crew can receive from services during flight and apply the content of this information for the continuation of the flight.	Yes	2	3	Yes
050 10 03 04	**Meteorological warnings**				
LO	Describe and interpret aerodrome warnings and wind shear warnings and alerts.	Yes	2	3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
092 00 00 00	**IFR COMMUNICATIONS**				
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.	No		3	Yes
092 01 02 00	**Air traffic control (ATC) abbreviations**				
LO	As for VFR plus additional IFR-related terms.	No		3	Yes
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.	Yes	2	2	No
LO	State the procedure for obtaining a bearing information in flight.	Yes	2	2	No
092 01 04 00	**Categories of messages**				
LO	List the categories of messages in order of priority.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Identify the types of messages appropriate to each category.	Yes	2	2	No
LO	List the priority of a message (given examples of messages to compare).	Yes	2	2	No
092 02 00 00	**GENERAL OPERATING PROCEDURES**				
092 02 01 00	**Transmission of letters**				
LO	State the phonetic alphabet used in radio-telephony.	Yes	2	2	No
LO	Identify the occasions when words should be spelt.	Yes	2	2	No
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.	Yes	2	2	No
092 02 03 00	**Transmission of time**				
LO	Describe the ways of transmitting time: — standard time reference (UTC), — minutes, minutes and hours, when required.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
092 02 04 00	**Transmission technique**				
092 00 00 00	**Explain the techniques used for making good RTF transmissions**				
092 02 05 00	**Standard words and phrases (relevant RTF phraseology included)**				
LO	Define the meaning of standard words and phrases.	Yes	2	2	No
LO	Use correct standard phraseology for each phase of IFR flight: — pushback, — IFR departure, — airways clearances, — position reporting, — approach procedures, — IFR arrivals.	No		3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
092 02 06 00	**Radio-telephony call signs for aeronautical stations including use of abbreviated call signs**				
LO	As for VFR.	Yes	2	2	No
LO	Name the two parts of the call sign of an aeronautical station.	Yes	2	2	No
LO	Identify the call-sign suffixes for aeronautical stations.	Yes	2	2	No
LO	Explain when the call sign may be abbreviated to the use of suffix only.	Yes	1	1	No
092 02 07 00	**Radio-telephony call signs for aircraft including use of abbreviated call signs**				
LO	As for VFR.	Yes	2	2	No
LO	Explain when the suffix ‘HEAVY’ should be used with an aircraft call sign.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Explain the use of the phrase 'Change your call sign to …'.	Yes	2	2	No
LO	Explain the use of the phrase 'Revert to flight plan call sign'.	No		1	Yes
092 02 08 00	**Transfer of communication**				
LO	Describe the procedure for transfer of communication: — by ground station, — by aircraft.	Yes	2	2	No
092 02 09 00	**Test procedures including readability scale; establishment of RTF communication**				
LO	Explain how to test radio transmission and reception.	Yes	2	2	No
LO	State the readability scale and explain its meaning.	Yes	2	2	No
092 02 10 00	**Read-back and acknowledgement requirements**				
LO	State the requirement to read back ATC route clearances.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State the requirement to read back clearances related to runway in use.	Yes	2	2	No
LO	State the requirement to read back other clearances including conditional clearances.	Yes	2	2	No
LO	State the requirement to read back data such as runway, SSR codes, etc.	Yes	2	2	No
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.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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).	Yes	2	2	No
092 03 00 00	**ACTION REQUIRED TO BE TAKEN IN CASE OF COMMUNICATION FAILURE**				
LO	Describe the action to be taken in case of communication failure on an IFR flight.	No		3	Yes
LO	Describe the action to be taken in case of communication failure on an IFR flight when flying in VMC and the flight will be terminated in VMC.	No		3	Yes
LO	Describe the action to be taken in case of communication failure on an IFR flight when flying in IMC.	No		3	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	2	2	No
LO	List the content of a PAN MEDICAL message in correct sequence.	Yes	2	2	No
092 04 02 00	**Distress (definition, frequencies, watch of distress frequencies, distress signal, distress message)**				
LO	State the DISTRESS procedures.	Yes	2	2	No
LO	Define 'DISTRESS'.	Yes	1	1	No
LO	Identify the frequencies that should be used by aircraft in DISTRESS.	Yes	2	2	No
LO	Specify the emergency SSR codes that may be used by aircraft, and the meaning of the codes.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	Describe the action to be taken by the station which receives a DISTRESS message.	Yes	2	2	No
LO	Describe the action to be taken by all other stations when a DISTRESS procedure is in progress.	Yes	2	2	No
LO	List the content of a DISTRESS message.	Yes	2	2	No
092 04 03 00	**Urgency (definition, frequencies, urgency signal, urgency message)**				
LO	State the URGENCY procedures.	Yes	2	2	No
LO	Define 'URGENCY'.	Yes	1	1	No
LO	Identify the frequencies that should be used by aircraft in URGENCY.	Yes	2	2	No
LO	Describe the action to be taken by the station which receives an URGENCY message.	Yes	2	2	No
LO	List the content of an URGENCY signal/message in the correct sequence.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
092 05 00 00	**RELEVANT WEATHER INFORMATION TERMS (IFR)**				
092 05 01 00	**Aerodrome weather**				
LO	As for VFR plus the following:	Yes	2	2	No
LO	Runway visual range;	No		3	Yes
LO	Braking action (friction coefficient).	No		3	Yes
092 05 02 00	**Weather broadcast**				
LO	As for VFR plus the following:	Yes	2	2	No
LO	Explain when aircraft routine meteorological observations should be made;	Yes	2	2	No
LO	Explain when aircraft special meteorological observations should be made.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
092 06 00 00	**GENERAL PRINCIPLES OF VHF PROPAGATION AND ALLOCATION OF FREQUENCIES**				
LO	Describe the radio-frequency spectrum with particular reference to VHF.	Yes	2	2	No
LO	State the names of the bands into which the radio-frequency spectrum is divided.	Yes	1	1	No
LO	Identify the frequency range of the VHF band.	Yes	1	1	No
LO	Name the band normally used for aeronautical mobile service voice communications.	Yes	1	1	No
LO	State the frequency separation allocated between consecutive VHF frequencies.	Yes	1	1	No
LO	Describe the propagation characteristics of radio transmissions in the VHF band.	Yes	1	1	No
LO	Describe the factors which reduce the effective range and quality of radio transmissions.	Yes	2	2	No

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
LO	State which of these factors apply to the VHF band.	Yes	2	2	No
LO	Calculate the effective range of VHF transmissions assuming no attenuating factors.	Yes	2	2	No
092 07 00 00	**MORSE CODE**				
LO	Identify radio-navigation aids (VOR, DME, NDB, ILS) from their Morse-code identifiers.	No		2	Yes
LO	SELCAL, TCAS, ACARS phraseology and procedures.	No		2	Yes

Syllabus reference	Syllabus details and associated learning objectives from the CBM IR syllabus	Is this covered in the PPL syllabus? (AMC1 FCL.210; FCL.215)	Expected level of knowledge (PPL)	Expected level of knowledge (BIR)	BIR syllabus to be covered?
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.	Yes	2	3	Yes
LO	For each of these indicate the various locations, and 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.	Yes	2	3	Yes
LO	Explain the purpose of heating and interpret the effect of heating on sensed pressure.			1	Yes
LO	List the affected instruments and explain the consequences for the pilot in case of a malfunction including blockage and leakage.	Yes	2	3	Yes
LO	Describe alternate static sources and their effects when used.	Yes	1	3	Yes
022 02 04 00	**Altimeter**				

LO	Define the following terms: — height, — altitude, — indicated altitude, — true altitude, — pressure altitude, — density altitude.	Yes	1	2	Yes
LO	Define the following barometric references: QNH, QFE, 1013,25 hPa.	Yes	3	3	
LO	Explain the operating principles of an altimeter.	Yes	2	2	No
LO	Describe and compare the following three types of altimeters: — simple altimeter (single capsule) — sensitive altimeter (multi-capsule), and — servo-assisted altimeter.	Yes	1	2	Yes
LO	Give examples of associated displays: pointer, multi-pointer, drum, vertical straight scale.	Yes	1	1	No’

4. References

4.1. Affected regulation

Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 311, 25.11.2011, p. 1)

4.2. Affected AMC and GM

Decision No 2011/016/R of the Executive Director of the European Aviation Safety Agency of 15 December 2011 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council ('Acceptable Means of Compliance and Guidance Material to Part-FCL')

4.3. Reference documents

— Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC
(OJ L 79, 19.3.2008, p. 1)

— General Aviation Road Map (http://easa.europa.eu/easa-and-you/general-aviation)