European Aviation Safety Agency

# Notice of Proposed Amendment 2016-03(C)

# Technical review of the theoretical knowledge syllabi, learning objectives, and examination procedures for air transport pilot licence, multi-crew pilot licence, commercial pilot licence, and instrument ratings

*Subject 010 — Air law*
*Subject 031 — Mass and balance*
*Subject 032 — Performance (aeroplane)*
*Subject 033 — Flight planning and monitoring*
*Subject 034 — Performance (helicopter)*

RMT.0595 — 9.6.2016


**EXECUTIVE SUMMARY**

This Notice of Proposed Amendment (NPA) addresses a safety and regulatory coordination issue related to flight crew licensing. It has been developed in response to the European Aviation Safety Plan (EASP) safety actions.

This NPA updates the Learning Objectives (LOs) for the theoretical knowledge (TK) syllabi and ground school examinations, and introduces the threat and error management (TEM) concept and its application. The amendments proposed in this NPA aim to ensure that the LOs correspond to today's operational environment and that commercial pilots are equipped with the knowledge and understanding relevant to modern flight deck and current industry needs. The proposed updated pilot training will contribute to the overall enhancement of the pilots' core competencies and their ability to make informed decisions.

The NPA also introduces new LOs under Area 100 'knowledge, skills and attitudes' (KSA), whose aim is to enhance the pilots' KSA contained in the core competencies. New requirements are proposed for approved training organisations (ATOs) to assess student pilots' KSA. These skills focus on the pilots' ability to apply their knowledge and understanding across subjects and to demonstrate technical and non-technical skills. These LOs will, therefore, not be the subject of examinations organised by the competent authority or its agents, but will be assessed by the ATOs to ensure that trainee pilots have an adequate level of competency before they are allowed to sit their final TK examinations.

The NPA also recommends that EASA develop a process to regularly review and update the LOs so that they are up to date with emerging safety threats as well as with developments in technology and operational practice.


| Applicability | |
|---|---|
| Affected regulations and decisions: | ED Decisions 2011/016/R; 2012/006/R; 2012/007/R; 2014/020/R; 2014/022/R; 2016/008/R |
| Affected stakeholders: | Competent authorities; ATOs; student pilots; providers of textbooks and training materials; ECQB |
| Driver/origin: | Safety |
| Reference: | EASA 4-year Rulemaking Programme; EASA ECQB Project |

| Process map | |
|---|---|
| Concept paper: | No |
| Terms of reference: | 11.3.2015 |
| Rulemaking group: | Yes |
| RIA type: | Light |
| Technical consultation during NPA drafting: | Yes |
| Duration of NPA consultation: | 3 months |
| Review group: | Yes |
| Focused consultation: | No |
| Publication date of the Opinion: | N/A |
| Publication date of the Decision: | 2016/Q4 |

## Overview of the proposed amendments to Subject 010 'Air law'

The following main amendments to Subject 010 'Air law' have been made:

— The LOs about general agreements (such as the International Air Services Transit Agreement (ICAO Doc 7500); the Tokyo, The Hague and Montral Conventions; the Rome and Warsaw Bilateral Agreement) have been deleted.

— Descriptions of organisations like the International Air Transport Association (IATA) and the European Civil Aviation Conference (ECAC) have been deleted.

— LOs on certification specifications and ICAO Annex 8 'Airworthiness of Aircraft', as far as they do not belong to the necessary knowledge of a professional pilot, have been deleted.

— 11 new LOs have been introduced.

— Standardised European Rules of the Air (SERA) and ICAO Annex 2 'Rules of the Air' have been added.

— Fix tolerance areas are outdated in the new world of required navigation performance (RNP) and performance-based navigation (PBN). The use of flight management system (FMS)/area navigation (RNAV) equipment has been removed as that has no relevance for Subject 010. LOs about parallel instrument approaches are not relevant anymore.

— Reference to Commission Regulation (EU) No 965/2012 for all types of air operations has been added.

— LOs verifying in which part of the aeronautical information publication (AIP) a certain content can be found have been deleted as this information can be viewed in the table of contents.

— Radio altimeter operating areas are outdated and thus deleted.

— Details in LOs about clearances have been deleted.

As regards abbreviations, please refer to the ICAO Doc 9713 'International Civil Aviation Vocabulary', Third Edition, 2007.

**SUBJECT 010 — AIR LAW**

*Note that the term 'mass' is used to describe a quantity of matter, and 'weight' when describing the force. However, the term 'weight' is normally used in aviation to colloquially describe mass. The professional pilot should always note the units to determine if the term 'weight' is being used to describe a force (e.g. unit newton) or quantity of matter (e.g. unit kilogram).*

(1) The subjects 'Air law' and 'ATC procedures' are primarily based on ICAO documentation and European Union regulations.

(2) National law should not be taken into account for theoretical examination purposes; it should remain relevant though during practical training and operational flying.

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **010 00 00 00** | | **AIR LAW** | | | | | | | | |
| **010 01 00 00** | | **INTERNATIONAL LAW: CONVENTIONS, AGREEMENTS AND ORGANISATIONS** | | | | | | | | |
| **010 01 01 00** | | **The Convention on International Civil Aviation (Chicago) — ICAO DOC 7300** | | | | | | | | |
| (01) | X | Explain the ~~historical background~~ circumstances that led to the establishment of the Convention on International Civil Aviation, Chicago, 7 December 1944. | X | X | X | X | X | | | Clarity |
| ***010 01 01 01*** | | ***Part I — Air navigation*** | | | | | | | | |
| (01) | X | Be familiar with the general contents of relevant parts of the following c~~C~~hapters:<br>— general principles and application of the Convention; | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — flight over territory of C~~c~~ontracting States;<br>— nationality of aircraft;<br>— ~~measures to facilitate air navigation;~~<br>— ~~conditions to be fulfilled with respect to aircraft;~~<br>— international standards and recommended practices (SARPs), especially notification of differences and validity of endorsed certificates and licences. | | | | | | | | |
| (02) | X | General principles<br>Describe the application of the following terms in civil aviation:<br>— sovereignty;<br>— territory~~,~~ and high seas~~,~~ according to the UN Convention on the High Seas. | X | X | X | X | X | | | |
| (03) | | ~~Define~~ Explain the following terms and ~~explain~~ how they apply to international air traffic:<br>— right of non-scheduled flight ~~(~~including the two technical freedoms of the air~~)~~;<br>— scheduled air services;<br>— cabotage;<br>— landing at customs airports;<br>— ~~applicability of air regulations;~~<br>— R~~r~~ules of the A~~a~~ir;<br>— search of aircraft. | X | X | X | X | X | | | |
| (04) | X | ~~Describe~~ Explain the duties of Contracting States in relation | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | to:<br>— documents carried on board ~~of~~ the aircraft:<br>• certificate of registration;<br>• certificates of airworthiness;<br>• licences of personnel;<br>• recognition of certificates and licences;<br>— cargo restrictions;<br>— photographic apparatuses. | | | | | | | | |
| ***010 01 01 02*** | | ***Part II — The International Civil Aviation Organization (ICAO)*** | | | | | | | | |
| (01) | X | Describe the objectives of ICAO. | X | X | X | X | X | | | |
| (02) | X | ~~Explain~~ Recognise the organisation and duties of the ICAO Assembly, Council and Air Navigation Commission (ANC). | X | X | X | X | X | | | |
| ~~LO (03)~~ | | ~~Explain the organisation and duties of the ICAO Headquarters and Regional Offices.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ~~LO (04)~~ | | ~~Describe the worldwide ICAO regions.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| (05) | X | ~~Be familiar with~~ Describe the ~~hierarchy of the ICAO publications (SARPs, Docs):~~<br>~~—~~ annexes to the Convention.~~;~~<br>— ~~documents.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use except for the Annexes |
| **010 01 02 00** | | **Other conventions and agreements** | | | | | | | | |
| ***010 01 02 01*** | | ***The International Air Services Transit Agreement (ICAO Doc 7500)*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ~~LO (01)~~ | | Explain the two technical freedoms of the air. | X | X | X | X | X | | | |
| ***010 01 02 02*** | | ***The International Air Transport Agreement (ICAO Doc 7500)*** | | | | | | | | Clarification |
| (01) | | Explain the three commercial freedoms of the air. | X | X | X | X | X | | | |
| ~~LO (02)~~ | | ~~Describe the legal situation within the EU with regard to the Freedoms of the Air.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ***010 01 02 03*** | | ***Suppression of U~~u~~nlawful A~~a~~cts A~~a~~gainst the S~~s~~afety of C~~c~~ivil A~~a~~viation~~;~~ — T~~t~~he ~~Conventions of~~ Tokyo, The Hague and Montreal Convention of 1988*** | | | | | | | | No practical use |
| ~~LO (01)~~ | | ~~Explain the facts that led to the Conventions and Supplements concerning unlawful acts against the safety of civil aviation.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |
| ~~LO (02)~~ | | ~~Explain the content of the Convention on Unlawful Acts Committed on Board Aircraft.~~<br>~~(Doc 8364 — Convention on Offences and Certain Other Acts Committed on Board Aircraft, Tokyo, 14 September 1963)~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |
| ~~LO (03)~~ | | ~~Explain the content of the Convention on Suppression of Unlawful Seizure of Aircraft.~~<br>~~(Doc 8920 — Convention for the Suppression of Unlawful Seizure of Aircraft, The Hague, 16 December 1970, and Protocol for the Suppression of Unlawful Acts against the Safety of Civil Aviation, Montreal, 23 September 1971)~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ~~LO (04)~~ | | ~~Explain the content of the Convention on Suppression of~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ~~Unlawful Acts of Violence at Airports Serving International Civil Aviation in accordance with Doc 8966 — Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation, done at Montreal on 23.9.1971, and signed at Montreal on 24 February 1988).~~ | | | | | | | | |
| (05) | | Describe the measures and actions to be taken by the pilot-in-command (PIC) of an aircraft in order to suppress unlawful acts against the safety of the aircraft.<br>(Doc 9518 — Protocol supplementary to the Convention for the Suppression of Unlawful Acts A~~a~~gainst the Safety of Civil Aviation, done at Montreal on 23 September 1971, and signed at Montreal on 24 February 1988) | X | X | X | X | X | | | |
| ***010 01 02 04*** | | ***~~Bilateral agreements~~ Intentionally left blank*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the reason for the existence of bilateral agreements for scheduled air transport~~<br>~~(Digest of Bilateral Air Transport Agreements, ICAO Doc 9511).~~ | ~~X~~ | | ~~X~~ | ~~X~~ | | | | No practical use |
| ***010 01 02 05*** | | ***International private law*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the Conventions and Protocols designed to cover liability towards persons and goods in accordance with the Warsaw System based on the Convention for the Unification of Certain Rules Relating to International Carriage by Air, Warsaw, 2 October 1929.~~ | X | X | X | X | X | | | No practical use |
| (02) | | Explain the legal significance of the issue of a passenger ticket and/or of baggage/cargo documents (that it forms a | X | X | X | X | X | | | Clarification |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | contract). | | | | | | | | |
| (03) | | Describe the consequences for an airline and/or the PIC when a passenger ticket is not issued (that the contract is unaffected). | X | X | X | X | X | | | Clarification |
| ~~LO (04)~~ | | ~~Explain that the liability towards persons and goods may be unlimited on the basis of the Montreal Convention of 28 May 1999.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| (05) | X | Explain the consequences for an airline operator of Regulation (EC) No 261/2004~~about~~ on passenger rights in the event ~~case~~ of delay, cancellation or denied boarding. | X | X | X | X | X | | | |
| (06) | | Explain the liability limit in relation to destruction, loss, damage or delay of baggage. | X | X | X | X | X | | | |
| ***~~010 01 02 06~~*** | | ***~~Operators' and pilots' liabilities towards persons and goods on the ground in case of damage and injury caused by the operation of the aircraft~~*** | | | | | | | | No practical use |
| ~~LO (01)~~ | | ~~Explain the Conventions and Protocols designed to cover liability towards persons and goods on the ground based on the International Convention for rules relating to Damage Caused by aircraft, signed at Rome on 29 May 1933 and on 7 October 1952, and at Montreal on 23 September 1978.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |
| ***~~010 01 02 07~~*** | | ***~~The Convention of Rome (1933) and other documents related to rights in aircraft~~*** | | | | | | | | No practical use |
| ~~LO (01)~~ | | ~~Understand the rules relating to international recognition of rights in aircraft and the rules relating to precautionary arrest of aircraft.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **010 01 03 00** | | **World organisations** | | | | | | | | |
| ***010 01 03 01*** | | ***The International Air Transport Association (IATA)*** | | | | | | | | |
| (01) | | Describe the ~~general organisation and~~ objectives of IATA. | X | | X | X | | | | |
| **010 01 04 00** | | **European organisations** | | | | | | | | |
| ***010 01 04 01*** | | ***European Aviation Safety Agency (EASA)*** | | | | | | | | |
| (01) | X | Describe the ~~general organisation and~~ objectives of EASA. | X | X | X | X | X | | | |
| (02) | | Describe the role of EASA in European civil aviation. | X | X | X | X | X | | | |
| ~~LO (03)~~ | | ~~Describe the role of the National Aviation Authorities (NAAs) in relation to EASA.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ~~LO (04)~~ | | ~~Give an overview of the EASA Regulations' structure.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ~~LO (05)~~ | | ~~Describe the relationship between EASA, ICAO and other organisations.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ***010 01 04 02*** | | ***EUROCONTROL*** | | | | | | | | |
| (01) | X | Describe the ~~objectives of the Convention relating to the Cooperation for the Safety of Air Navigation (EUROCONTROL) and the~~ Single European Sky (SES) Regulations. | X | X | X | X | X | | | |
| ~~***010 01 04 03***~~ | | ~~***European Civil Aviation Conference (ECAC)***~~ | | | | | | | | No practical use |
| ~~LO (01)~~ | | ~~Give a brief summary of the European Civil Aviation Conference (ECAC).~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **010 02 00 00** | | **AIRWORTHINESS OF AIRCRAFT, AIRCRAFT NATIONALITY AND REGISTRATION MARKS** | | | | | | | | To combine two small paragraphs for exam profile |
| **010 02 01 00** | | ~~**ICAO Annex 8 and the related Certification Specifications**~~ ***Intentionally left blank*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the definitions of ICAO Annex 8.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ~~LO (02)~~ | | ~~Explain how the Airworthiness Standards of ICAO Annex 8 and the Certification Specifications (CSs) are related to each other.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ~~LO (03)~~ | | ~~State which aircraft the Standards of ICAO Annex 8 and the CSs shall apply to.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| **010 02 02 00** | | **Certificate of Airworthiness (CofA)** | | | | | | | | |
| (01) | | State the issuing authority of a CofA. | X | X | X | X | X | | | |
| (02) | | State the necessity to ~~have~~hold a CofA. | X | X | X | X | X | | | |
| (03) | X | Explain the various elements that are required for the issue of a CofA. | X | X | X | X | X | | | |
| (04) | | State who shall determine an aircraft's continuing airworthiness. | X | X | X | X | X | | | |
| (05) | | Describe how a ~~Certificate of Airworthiness~~ CofA can be renewed or may remain valid. | X | X | X | X | X | | | |
| ~~**010 03 00 00**~~ | | ~~**AIRCRAFT NATIONALITY AND REGISTRATION MARKS**~~ | | | | | | | | |
| ~~**010 03 01 00**~~ **010 02 03 00** | | **Definitions of ICAO Annex 7 'Aircraft Nationality and Registration Marks'** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | X | Recall the definition of the following terms:<br>— aircraft;<br>— heavier-than-air aircraft;<br>— State of Registry. | X | X | X | X | X | | | |
| ~~**010 03 02 00**~~ **010 02 04 00** | | **Aircraft nationality, common marks and registration marks to be used** | | | | | | | | |
| (01) | | State the location of nationality and of common marks and registration marks. | X | | X | | | | | |
| ~~LO (02)~~ | | ~~Explain the combination of nationality and registration marks (sequence, use of hyphen).~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| (03) | | State who is responsible for assigning registration marks. | X | X | X | X | X | | | |
| **010 04 00 00** | | **PERSONNEL LICENSING** | | | | | | | | |
| **010 04 01 00** | | **ICAO Annex 1** | | | | | | | | |
| ***010 04 01 01*** | | ***Differences between ICAO Annex 1 and the Aircrew Regulation (EU) No 1178/2011*** | | | | | | | | |
| (01) | X | Describe the relationship and differences between ICAO Annex 1 and the Aircrew Regulation. | X | X | X | X | X | X | | |
| **010 04 02 00** | | **Aircrew Regulation — Part-FCL** | | | | | | | | |
| ***010 04 02 01*** | | ***Definitions*** | | | | | | | | |
| (01) | | Define the following:<br>Category, class and type of aircraft, cross-country, dual instruction time, flight time, student pilot-in-command | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | (SPIC), instrument time, instrument flight time, instrument ground time, ~~MCC , multi-pilot aircraft,~~ night, private pilot, proficiency check, renewal, revalidation, skill test, solo flight time~~, type of aircraft~~. | | | | | | | | |
| (02) New | | Define the following:<br>Multi-crew cooperation (MCC), multi-pilot aircraft, rating. | X | X | X | X | X | | | New LO created from 010 04 02 01 (01) and improved |
| ***010 04 02 02*** | | ***Content and structure*** | | | | | | | | |
| (01) | X | Explain the structure of Part-FCL. | X | X | X | X | X | X | X | |
| ~~(02)~~ | | ~~Understand the difference between Part-FCL and AMC/GM to Part-FCL.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| (03) | | Explain the requirements to act as a flight crew member of a civil aircraft registered in a Member State, and know the general principles of the licensing system (light aircraft pilot licence (LAPL), private pilot licence (PPL), commercial pilot licence (CPL), multi-crew pilot licence (MPL), airline transport pilot licence (ATPL)). | X | X | X | X | X | X | | |
| ~~LO (04)~~ | | ~~State to what extent Member States will accept certificates issued by other Member States.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| (05) | X | List the two factors that are relevant to the exercise of the privileges of a licence. | X | X | X | X | X | X | | |
| (06) | X | State the circumstances in which a language proficiency endorsement is required. | X | X | X | X | X | X | | |
| (07) | X | List the restrictions for licence holders with an age of 60 years or more. | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (08) | X | Explain the term 'competent authority'. | X | X | X | X | X | X | | |
| (09) | | Describe the obligation to carry and present documents (e.g. a flight crew licence) under Part-FCL. | X | X | X | X | X | X | | |
| ***010 04 02 03*** | | ***Commercial p~~P~~ilot l~~L~~icence (CPL)*** | | | | | | | | |
| (01) | X | State the requirements for the issue of a CPL. | X | X | X | X | X | | | |
| (02) | | State the privileges of a CPL. | X | X | X | X | X | | | |
| ***010 04 02 04*** | | ***Airline t~~T~~ransport p~~P~~ilot l~~L~~icence (ATPL) and m~~M~~ulti-crew p~~P~~ilot l~~L~~icence (MPL)*** | | | | | | | | |
| (01) | X | State the requirements for the issue of an ATPL ~~and MPL~~. | X | | X | X | | | | Deletion is in the new LO (03) |
| (02) | | State the privileges of an ATPL ~~and MPL~~. | X | | X | X | | | | Deletion is in the new LO (04) |
| (03) New | X | State the requirements for the issue of an MPL. | X | | | | | | | New LO split from 010 04 02 04 (01) |
| (04) New | | State the privileges of an MPL. | X | | | | | | | New LO split from 010 04 02 04 (02) |
| ***010 04 02 05*** | | ***Ratings*** | | | | | | | | |
| (01) | | Explain the requirements for class ratings, their validity and privileges. | X | X | | | | | | |
| (02) | | Explain the requirements for type ratings, their validity and privileges. | X | X | X | X | X | | | |
| (03) | | Explain the requirements for instrument ratings, their validity and privileges (instrument rating (IR), competency- | X | | X | | | X | X | New categories added |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | based instrument rating (CBIR) and en-route instrument rating (EIR)). | | | | | | | | |
| (04) New | | Explain the requirements for other ratings, their validity and privileges according to Part-FCL. | X | X | X | X | X | | | |
| **010 04 03 00** | | **Aircrew Regulation — Part-MED** | | | | | | | | |
| (01) | x | Describe the relevant content of Part-MED — Medical Requirements (administrative parts and requirements related to licensing only). | X | X | X | X | X | X | | |
| (02) | | State the requirements for the issue of a medical certificate. | X | X | X | X | X | X | | |
| (03) | | Name the ~~kind~~ class of medical certificate required when exercising the privileges of a CPL, MPL or ATPL. | X | X | X | X | X | | | |
| (04) | | State the actions to be taken in case of a decrease in medical fitness. | X | X | X | X | X | X | | |
| **010 05 00 00** | | **RULES OF THE AIR ACCORDING TO ICAO ANNEX 2 AND SERA** | | | | | | | | |
| **010 05 01 00** | | **Overview ~~Definitions~~ of ICAO Annex 2 and SERA** | | | | | | | | SERA included |
| (01) | | Explain the main content ~~definitions~~ of ICAO Annex 2. | X | X | X | X | X | X | | |
| (02) New | | Explain the main content of SERA. | X | X | X | X | X | X | | |
| **010 05 02 00** | | **Applicability of the Rules of the Air** | | | | | | | | |
| (01) | | Explain the principle of territorial application of the various Rules of the Air, e.g. ICAO, SERA, national rules. | X | X | X | X | X | | | |
| (02) | | Explain the compliance with the Rules of the Air. | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (03) | | State ~~who on board~~ that the PIC of an aircraft is primarily responsible for the operation of the aircraft in accordance with the Rules of the Air. | X | X | X | X | X | | | More precise |
| (04) | | Indicate under what circumstances departure from the Rules of the Air may be allowed. | X | X | X | X | X | | | |
| (05) | | Explain the duties of the PIC concerning pre-flight actions in case of an instrument flight rule (IFR) flight. | X | | X | | | X | X | |
| (06) | | State ~~who~~ that the PIC has the ultimate~~final~~ authority ~~as to the disposition of the aircraft~~ regarding the operation of the aircraft. | X | X | X | X | X | | | |
| (07) | | Explain that the ~~problematic in the~~ use of psychoactive substances by flight crew members is prohibited. | X | X | X | X | X | X | | |
| **010 05 03 00** | | **General rules** | | | | | | | | |
| (01) | | Describe the rules for the avoidance of collisions. | X | X | X | X | X | | | |
| (02) | | Describe the lights to be displayed by aircraft. | X | X | X | X | X | | | |
| (03) | | Understand marshalling signals. | X | X | X | X | X | | | |
| (04) | | State the basic requirements for minimum height (HGT) for the flight over congested areas of cities, towns or settlements, or over an open-air assembly of persons. | X | X | X | X | X | | | |
| (05) | | Define when the cruising levels shall be expressed in terms of flight levels (FLs). | X | X | X | X | X | | | |
| (06) | | Define under what circumstances cruising levels shall be expressed in terms of altitudes (ALT). | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (07) | | Explain the limitation for proximity to other aircraft and the right-of-way rules, including holding at runway (RWY)-holding positions and lighted stop bars. | X | X | X | X | X | | | |
| (08) | | Describe the meaning of light signals displayed to and by the aircraft. | X | X | X | X | X | | | |
| (09) | | Describe the requirements when carrying out simulated instrument flights. | X | | X | | | X | X | |
| (10) | | Indicate the basic rules for an aircraft operating on and in the vicinity of an aerodrome (AD). | X | X | X | X | X | | | |
| (11) | | Explain the requirements for the submission of an air traffic services (ATS) flight plan. | X | X | X | X | X | | | |
| ~~LO (12)~~ | | ~~Explain why a time check has to be obtained before the flight.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | X | Too basic |
| (13) | | Explain the actions to be taken in case of flight plan change or delay. | X | X | X | X | X | X | | |
| (14) | | State the actions to be taken in case of inadvertent changes to track, true airspeed (TAS) and time estimate affecting the current flight plan. | X | X | X | X | X | X | | |
| (15) | | Explain the procedures for closing a flight plan. | X | X | X | X | X | | | |
| (16) | | State for which flights an air traffic control (ATC) clearance shall be obtained. | X | X | X | X | X | | | |
| (17) | | State how a pilot may request an ATC~~air traffic control~~ clearance. | X | X | X | X | X | | | |
| (18) | | State the action to be taken if an ATC~~air traffic control~~ | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
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| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | clearance is not satisfactory to a PIC~~pilot in command~~. | | | | | | | | |
| (19) | | Describe the required actions to be carried out if the continuation of a controlled visual flight rule (VFR) flight in visual meteorological conditions (VMC) is not practicable anymore. | X | | X | | | X | X | |
| (20) | | Describe the provisions for transmitting a position report to the appropriate ATS unit including time of transmission and normal content of the message. | X | X | X | X | X | X | X | |
| (21) | | Describe the necessary action when an aircraft experiences a communication (COM) failure. | X | X | X | X | X | X | X | |
| (22) | | State what information an aircraft being subjected to unlawful interference shall give to the appropriate ATS unit. | X | X | X | X | X | X | | |
| **010 05 04 00** | | **Visual f~~F~~light r~~R~~ules (VFRs)** | | | | | | | | |
| (01) | | Describe the VFRs~~Visual Flight Rules~~ as contained in Chapter 4 of ICAO Annex 2. | X | X | X | X | X | | | ICAO exam |
| **010 05 05 00** | | **Instrument f~~F~~light r~~R~~ules (IFRs)** | | | | | | | | |
| (01) | | Describe the IFRs~~Instrument Flight Rules~~ as contained in Chapter 5 of ICAO Annex 2. | X | | X | | | X | X | ICAO exam |
| **010 05 06 00** | | **Interception of civil aircraft** | | | | | | | | |
| (01) | | List the possible reasons for intercepting a civil aircraft. | X | X | X | X | X | | | |
| (02) | | State what primary action should be carried out by an intercepted aircraft. | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (03) | | State which frequency should primarily be tried in order to contact an intercepting aircraft. | X | X | X | X | X | | | |
| (04) | | State on which mode and code a transponder on board the intercepted aircraft should be operated. | X | X | X | X | X | | | |
| (05) | | Recall the interception signals and phrases. | X | X | X | X | X | | | |
| **010 06 00 00** | **X** | **~~PROCEDURES FOR AIR NAVIGATION SERVICES —~~ AIRCRAFT OPERATIONS ~~(PANS- OPS)~~** | | | | | | | | |
| **010 06 01 00** | | **~~Foreword and introduction~~ PANS-OPS Flight Procedures (ICAO Doc 8168, Volume I)** | | | | | | | | |
| ~~LO (01)~~ | | ~~Translate the term 'PANS-OPS' into plain language.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | | No practical use |
| ~~LO (02)~~ | | ~~State the general aim of PANS-OPS Flight Procedures (ICAO Doc 8168, Volume I).~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | | No practical use |
| **010 06 02 00** | | **Definitions and abbreviations** | | | | | | | | |
| (01) | X | Recall all definitions included in ICAO Doc 8168, Volume I, Part I, Chapter 1. | X | | X | | | X | | |
| (02) | X | Interpret all abbreviations as shown in ICAO Doc 8168, Volume I, Part I, Chapter 2. | X | | X | | | X | | |
| **010 06 03 00** | | **Departure procedures** | | | | | | | | |
| ***010 06 03 01*** | | ***General criteria (assuming all engines operating)*** | | | | | | | | |
| (01) | X | Name the factors dictating the design of instrument departure procedures. | X | | X | | | X | X | |
| (02) | | Explain in which situations the criteria for omnidirectional | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | departures are applied. | | | | | | | | |
| ***010 06 03 02*** | | ***Standard instrument departures (SIDs)*** | | | | | | | | |
| (01) | | Define the terms 'straight departure' and 'turning departure'. | X | | X | | | X | X | |
| ~~LO (02)~~ | | ~~State the responsibility of the operator when unable to utilise the published departure procedures.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | No practical use |
| ***010 06 03 03*** | | ***Omnidirectional departures*** | | | | | | | | |
| (01) | | Explain when the 'omnidirectional method' is used for departure. | X | | X | | | X | X | |
| ~~LO (02)~~ | | ~~Describe the solutions when an omnidirectional procedure is not possible.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | |
| ***010 06 03 04*** | | ~~***Published information***~~ ***Intentionally left blank*** | | | | | | | | |
| ~~LO (01)~~ | | ~~State the conditions for the publication of a SID and/or RNAV route.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | |
| ~~LO (02)~~ | | ~~Describe how omnidirectional departures are expressed in the appropriate publication.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | |
| ***010 06 03 05*** | | ~~***Area Navigation (RNAV) departure procedures and RNP-based departures***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the relationship between RNAV/RNP-based departure procedures and those for approaches.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | Unecessary knowledge at this stage |
| **010 06 04 00** | | **Approach procedures** | | | | | | | | |
| ***010 06 04 01*** | | ***General criteria*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | General criteria (except the table 'Speeds for procedure calculations') of the approach procedure design:<br>— instrument approach areas;<br>— accuracy of fixes;<br>— fixes formed by intersections;<br>— intersection fix-tolerance factors;<br>— other fix-tolerance factors;<br>~~— approach area splays;~~<br>— descent gradient. | X | | X | | | X | | Approach splays unnecessary |
| (02) | | Name the five possible segments of an instrument approach procedure. | X | | X | | | X | X | |
| (03) | | Give reasons for establishing aircraft categories for the approach. | X | | X | | | X | X | |
| (04) | | State the maximum angle between the final approach track and the extended RWY centre line to still consider a non-precision approach as being a 'straight-in approach'. | X | | X | | | X | X | |
| (05) | | State the minimum obstacle clearance (MOC) provided by the minimum sector altitudes (MSAs) established for an aerodrome. | X | | X | | | X | X | |
| ~~LO (06)~~ | | ~~Describe the point of origin, shape, size and subdivisions of the area used for MSAs.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | Unnecessary knowledge |
| (07) | X | State that a pilot shall apply wind corrections when carrying out an instrument approach procedure. | X | | X | | | X | X | |
| (08) | | Name the most significant ~~performance~~ factor influencing | X | | X | | | X | X | Clarification |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | the conduct of instrument approach procedures. | | | | | | | | |
| (09) | | Explain why a pilot should not descend below obstacle clearance altitude/heights (OCA/Hs), which are established for:<br>— precision approach procedures;<br>— non-precision approach procedures;<br>— visual (circling) procedures. | X | | X | | | X | X | |
| (10) | | Describe in general terms the relevant factors for the calculation of operational minima. | X | | X | | | X | X | |
| (11) | | Translate the following acronyms into plain language:<br>DA, DH, OCA, OCH, MDA, MDH, MOC, DA/H, OCA/H, MDA/H. | X | | X | | | X | X | |
| (12) | | Explain the relationship between the terms:<br>DA, DH, OCA, OCH, MDA, MDH, MOC, DA/H, OCA/H, and MDA/H. | X | | X | | | X | X | |
| ***010 06 04 02*** | | ***Approach procedure design*** | | | | | | | | |
| (01) | | Describe how the vertical cross section for each of the five approach segments is broken down into the various areas. | X | | X | | | X | X | |
| (02) | | State within which area of the cross section the Minimum Obstacle Clearance (MOC) is provided for the whole width of the area. | X | | X | | | X | X | |
| (03) | | Define the terms ‘IAF’, ‘IF’, ‘FAF’, ‘MAPt’ and ‘TP’. | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ~~LO (04)~~ | | ~~Name the area within which the plotted point of an intersection fix may lie.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | | |
| ~~LO (05)~~ | | ~~Explain by which factors the dimensions of an intersection fix are determined.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | | |
| (06) | X | State the accuracy of facilities providing track (VHF omnidirectional radio range (VOR), instrument landing system (ILS), non-directional beacon (NDB)). | X | | X | | | X | X | |
| ~~LO (07)~~ | | ~~Describe the 'other fix tolerance factors':~~ ~~surveillance radar (Terminal Area Radar (TAR)), En Route Surveillance Radar (RSR), DME, 75 MHz marker beacon, fixes overhead a station (VOR, NDB).~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | | Unnecessary knowledge |
| ~~LO (08)~~ | | ~~Describe the basic information relating to approach-area splays.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | Outdated |
| (09) | | State the optimum descent gradient (preferred for a precision approach) in degrees and per cent. | X | | X | | | X | X | |
| ***010 06 04 03*** | | ***Arrival and approach segments*** | | | | | | | | |
| (01) | | Name the five standard segments of an instrument approach~~APP~~ procedure and state the beginning and end for each of them. | X | | X | | | X | X | |
| (02) | | Describe where an arrival~~ARR~~ route normally ends. | X | | X | | | X | X | |
| ~~LO (03)~~ | | ~~State whether or not omnidirectional or sector arrivals can be provided.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | |
| (04) | | Explain the main task of the initial approach~~APP~~ segment. | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (05) | | Describe the maximum angle of interception between the initial approach~~APP~~ segment and the intermediate approach~~APP~~ segment (provided at the intermediate fix) for a precision approach and a non-precision approach. | X | | X | | | X | X | |
| (06) | | Describe the main task of the intermediate approach~~APP~~ segment. | X | | X | | | X | X | |
| (07) | | State the main task of the final approach~~APP~~ segment. | X | | X | | | X | X | |
| (08) | | Name the two possible aims of a final approach~~APP~~. | X | | X | | | X | X | |
| (09) | | Explain the term 'final approach point' in case of an ILS approach. | X | | X | | | X | X | |
| (10) | | State what happens if an ILS glide path (GP) becomes inoperative during the approach~~APP~~. | X | | X | | | X | X | |
| ***010 06 04 04*** | | ***Missed approach*** | | | | | | | | |
| (01) | | Name the three phases of a missed approach procedure and describe their geometric limits. | X | | X | | | X | X | |
| (02) | | Describe the main task of a missed approach procedure. | X | | X | | | X | X | |
| ~~LO (03)~~ | | ~~State at which height/altitude the missed approach is assured to be initiated.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | Too vague |
| (04) | | Define the term 'missed approach point (MAPt)'. | X | | X | | | X | X | |
| (05) | | Describe how an MAPt may be established in an approach procedure. | X | | X | | | X | X | |
| (06) | | State the pilot's reaction if, upon reaching the MAPt, the required visual reference is not established. | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (07) | | Describe what a pilot is expected to do in the event a missed approach is initiated prior to arriving at the MAPt. | X | | X | | | X | X | |
| (08) | | State whether the pilot is obliged to cross the MAPt at the height (HGT)/altitude (ALT) required by the procedure or whether they are allowed to cross the MAPt at ~~a~~n HGT/ALT~~altitude/height~~ greater than that required by the procedure. | X | | X | | | X | X | |
| ***010 06 04 05*** | | ***Visual manoeuvring (circling) in the vicinity of the aerodrome (AD)*** | | | | | | | | |
| (01) | | Describe what is meant by 'visual manoeuvring (circling)'. | X | | X | | | X | X | |
| (02) | | 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. | X | | X | | | X | X | |
| (03) | | State for which category of aircraft the obstacle clearance altitude/height (OCA/H) within an established visual manoeuvring (circling) area is determined. | X | | X | | | X | X | |
| (04) | | Describe how a~~n~~ minimum descent altitude/height (MDA/H) is specified for visual manoeuvring (circling) if the OCA/H is known. | X | | X | | | X | X | |
| (05) | | State the conditions to be fulfilled before descending below MDA/H in a visual manoeuvring (circling) approach. | X | | X | | | X | X | |
| (06) | | Describe why there can be no single procedure designed that will cater for conducting a circling approach in every situation. | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (07) | | State how the pilot is expected to behave after initial visual contact during a visual manoeuvring (circling). | X | | X | | | X | X | |
| (08) | | Describe what the pilot is expected to do if visual reference is lost while circling to land from an instrument approach. | X | | X | | | X | X | |
| ***010 06 04 06*** | | ***~~Area Navigation (RNAV)~~ approach procedures based on VOR/distance-measuring equipment (DME)*** | | | | | | | | |
| (01) | | Describe the provisions that must be fulfilled before carrying out VOR/DME RNAV approaches. | X | | X | | | X | X | |
| (02) | | Explain the disadvantages of the VOR/DME RNAV system. | X | | X | | | X | X | |
| (03) | | List the factors the navigational accuracy of the VOR/DME RNAV system depends on. | X | | X | | | X | X | |
| (04) | | State whether the VOR/DME ~~/~~RNAV approach is a precision or a non-precision procedure. | X | | X | | | X | X | |
| ***~~010 06 04 07~~*** | | ***~~Use of FMS/RNAV equipment to follow conventional non-precision approach procedures~~*** | | | | | | | | Not relevant for 010 |
| ~~LO (01)~~ | | ~~State the provisions for flying the conventional non-precision approach procedures using FMS/RNAV equipment.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | | |
| **010 06 05 00** | | **Holding procedures** | | | | | | | | |
| ***010 06 05 01*** | | ***Entry and holding*** | | | | | | | | |
| (01) | | Explain why deviations from the in-flight procedures of a holding established in accordance with ICAO Doc 8168 are dangerous. | X | | X | | | X | X | |
| (02) | | State that if for any reasons a pilot is unable to conform to | X | | X | | | X | X | |

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| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | the procedures for normal conditions laid down for any particular holding pattern, they should advise ATC as early as possible. | | | | | | | | |
| ~~LO (03)~~ | | ~~Describe how right turn holdings can be transferred to left turn holding patterns.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | No practical use |
| (04) | | Describe the shape and terminology associated with the holding pattern. | X | | X | | | X | X | |
| (05) | | State the bank angle and rate of turn to be used whilst flying in a holding pattern. | X | | X | | | X | X | |
| (06) | | Explain why pilots in a holding pattern should attempt to maintain tracks and how this can be achieved. | X | | X | | | X | X | |
| (07) | | Describe where outbound timing begins in a holding pattern. | X | | X | | | X | X | |
| (08) | | State where the outbound leg in a holding terminates if the outbound leg is based on DME. | X | | X | | | X | X | |
| (09) | | Describe the three heading entry sectors for entries into a holding pattern. | X | | X | | | X | X | |
| (10) | | Define the terms ‘parallel entry’, ‘offset entry’ and ‘direct entry’. | X | | X | | | X | X | |
| (11) | | Determine the correct entry procedure for a given holding pattern. | X | | X | | | X | X | |
| (12) | | State the still air time for flying the outbound entry heading with or without DME. | X | | X | | | X | X | |
| (13) | | Describe what the pilot is expected to do when clearance is | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
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| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | received specifying the time of departure from the holding point. | | | | | | | | |
| ***010 06 05 02*** | | ***Obstacle clearance ~~(except table)~~*** | | | | | | | | |
| (01) | X | Describe the layout of the basic holding area, entry area and buffer area of a holding pattern. | X | | X | | | X | X | |
| (02) | X | State which obstacle clearance is provided by a minimum permissible holding level referring to the holding area, the buffer area (general only) and over high terrain or in mountainous areas. | X | | X | | | X | X | |
| **010 06 06 00** | | **Altimeter-setting procedures** | | | | | | | | |
| ***010 06 06 01*** | | ***Basic requirements and procedures*** | | | | | | | | |
| (01) | | Describe the two main objectives of altimeter settings. | X | X | X | X | X | X | X | |
| (02) | | Define the terms ‘QNH’ and ‘QFE’. | X | X | X | X | X | X | X | |
| (03) | | Describe the different terms for ALT~~altitude~~ or flight levels (FLs) respectively which are the references during climb or descent to change the altimeter settings from QNH to 1013.2 hPa and vice versa. | X | X | X | X | X | X | X | |
| (04) | | Define the term ‘f~~F~~light l~~L~~evel (FL)’. | X | X | X | X | X | X | X | |
| (05) | | State where FL~~flight level~~ zero shall be located. | X | X | X | X | X | X | X | |
| (06) | | State the interval by which consecutive FLs~~flight levels~~ shall be separated. | X | X | X | X | X | X | X | |
| (07) | | Describe how FLs~~flight levels~~ are defined ~~numbered~~. | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (08) | | Define the term 'tTransition aAltitude (TA)'. | X | X | X | X | X | X | X | |
| (09) | | State how TAsTransition Altitudes shall normally be specified. | X | X | X | X | X | X | X | |
| (10) | | Explain how the HGTheight of the TATransition Altitude is calculated and expressed in practice. | X | X | X | X | X | X | X | |
| (11) | | State where TAsTransition Altitudes shall be published. | X | X | X | X | X | X | X | |
| (12) | | Define the term 'tTransition lLevel (TRL)'. | X | X | X | X | X | X | X | |
| (13) | | State when the TRLTransition Level is normally passed on to the aircraft. | X | X | X | X | X | X | X | |
| (14) | | State how the vertical position of the aircraft shall be expressed at or below the TATransition Altitude and TRLTransition Level. | X | X | X | X | X | X | X | |
| (15) | | Define the term 'tTransition lLayer'. | X | X | X | X | X | X | X | |
| (16) | | Describe when the vertical position of an aircraft passing through the transition layer shall be expressed in terms of FLsflight levels and when in terms of ALTaltitude. | X | X | X | X | X | X | X | |
| (17) | | State when the QNH altimeter setting shall be made available to departing aircraft. | X | X | X | X | X | X | X | |
| (18) | | Explain when the vertical separation of an aircraft during en-route flight shall be assessed in terms of ALTaltitude and when in terms of FLsflight levels. | X | X | X | X | X | X | X | |
| (19) | | Explain when, in air–ground communications during an en-route flight, the vertical position of an aircraft shall be | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | expressed in terms of ALT~~altitude~~ and when in terms of FLs ~~flight levels~~. | | | | | | | | |
| (20) | | Describe why QNH altimeter-setting reports should be provided from sufficient locations. | X | X | X | X | X | X | X | |
| (21) | | State how a QNH altimeter setting shall be made available to aircraft approaching a controlled aerodrome (AD) for landing. | X | X | X | X | X | X | X | |
| (22) | | State under which circumstances the vertical position of an aircraft above the TRL~~transition level~~ may be referenced in ~~to~~ ALTs~~altitudes~~. | X | X | X | X | X | X | X | |
| ***010 06 06 02*** | | ***Procedures for operators and pilots*** | | | | | | | | |
| ~~LO (01)~~ | | ~~State the three requirements that selected altitudes or selected flight levels should have.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | No practical use |
| ~~LO (02)~~ | | ~~Describe a pre flight operational test in case of QNH setting and in case of QFE setting including indication (error) tolerances referred to the different test ranges.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Unnecessary knowledge |
| (03) | | State on which setting at least one altimeter shall be set prior to take-off. | X | X | X | X | X | X | X | |
| (04) | | State where during the climb the altimeter setting shall be changed from QNH to 1013.2 hPa. | X | X | X | X | X | X | X | |
| (05) | | Describe when a pilot of an aircraft intending to land at an AD shall obtain the TRL~~transition level~~. | X | X | X | X | X | X | X | |
| (06) | | Describe when a pilot of an aircraft intending to land at an AD shall obtain the actual QNH altimeter setting. | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (07) | | State where the altimeter settings shall be changed from 1013.2 hPa to QNH during descent for landing. | X | X | X | X | X | X | X | |
| **010 06 07 00** | | **Simultaneous operation on parallel or near-parallel instrument RWYs~~runways~~** | | | | | | | | |
| (01) | X | Describe the difference between independent and dependent parallel approaches. | X | X | X | X | X | X | X | |
| 02) | | Describe the following different operations:<br>— simultaneous instrument departures;<br>— segregated parallel approaches/departures;<br>— semi-mixed and mixed operations. | X | X | X | X | X | X | X | |
| (03) | | Know about 'normal operating zone (NOZ)' and 'no transgression zone (NTZ)'. | X | X | X | X | X | X | | |
| (04) | | Name the aircraft equipment requirements for conducting parallel instrument approaches. | X | X | X | X | X | X | | |
| (05) | | State under which circumstances parallel instrument approaches may be conducted. | X | X | X | X | X | X | | |
| (06) | | State the radar requirements for simultaneous, independent, and parallel instrument approaches, and how weather conditions effect these. | X | X | X | X | X | X | | |
| (07) | | State the maximum angle of interception for an ILS localiser course (CRS) or microwave landing system (MLS) final approach~~APP~~ track in case of simultaneous, independent, and parallel instrument approaches. | X | X | X | X | X | X | | |
| (08) | | Describe the special conditions for tracks on missed | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | approach procedures and departures in case of simultaneous~~,~~ or parallel operations. | | | | | | | | |
| **010 06 08 00** | | **Secondary surveillance radar (transponder) operating procedures** | | | | | | | | |
| ***010 06 08 01*** | | ***Operation of transponders*** | | | | | | | | |
| (01) | | State when and where the pilot shall operate the transponder. | X | X | X | X | X | X | X | |
| (02) | | State the modes and codes that the pilot shall operate in the absence of any ATC directions or regional air navigation agreements. | X | X | X | X | X | X | X | |
| (03) | | Indicate when the pilot shall operate Mode C. | X | X | X | X | X | X | | |
| (04) | | State when the pilot shall 'SQUAWK IDENT'. | X | X | X | X | X | X | X | |
| (05) | | State the transponder mode and code to indicate:<br>— a state of emergency;<br>— a COM~~communication~~ failure;<br>— unlawful interference. | X | X | X | X | X | X | X | |
| (06) | | Describe the consequences of a transponder failure in flight. | X | X | X | X | X | X | X | |
| (07) | | State the primary action of the pilot in the case of an unserviceable transponder before departure when no repair or replacement at the given AD~~aerodrome~~ is possible. | X | X | X | X | X | X | X | |
| (08) New | | Indicate when the pilot shall operate Mode S. | | | | | | | X | New LO |
| ***010 06 08 02*** | | ***Operation of airborne collision avoidance system (ACAS) equipment*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | Describe the main reason for using ACAS. | X | X | X | X | X | X | X | |
| (02) | | Indicate whether the 'use of ACAS indications' described in ICAO Doc 8168 is absolutely mandatory. | X | X | X | X | X | X | | |
| (03) | | Explain the pilots' reaction required to allow ACAS to fulfil its role of assisting pilots in the avoidance of potential collisions. | X | X | X | X | X | X | | |
| (04) | | Explain why pilots shall not manoeuvre their aircraft in response to t~~T~~raffic a~~A~~dvisories (TAs) only. | X | X | X | X | X | X | | |
| (05) | | Explain the significance of ~~Traffic Advisories~~ TAs in view of possible r~~R~~esolution a~~A~~dvisories (RAs). | X | X | X | X | X | X | | |
| (06) | | State why a pilot should follow RAs~~Resolution Advisories~~ immediately. | X | X | X | X | X | X | | |
| (07) | | List the reasons which may force a pilot to disregard an RA~~Resolution Advisory~~. | X | X | X | X | X | X | | |
| ~~LO (08)~~ | | ~~Decide how a pilot shall react if there is a conflict between Resolution Advisories in case of an ACAS/ACAS coordinated encounter Resolution Advisories.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | Too vague |
| (09) | | Explain the importance of instructing ATC immediately that an RA~~Resolution Advisory~~ has been followed. | X | X | X | X | X | X | | |
| (10) | | Explain the duties of a pilot as regards ~~far as~~ ATC ~~is concerned~~ when an RA~~Resolution Advisory~~ situation is resolved. | X | X | X | X | X | X | | |
| **010 07 00 00** | | **AIR TRAFFIC SERVICES (ATS) AND AIR TRAFFIC MANAGEMENT (ATM)** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **010 07 01 00** | | **ICAO Annex 11 — Air Traffic Services** | | | | | | | | |
| ***010 07 01 01*** | | ***Definitions*** | | | | | | | | |
| (01) | X | Recall the definitions given in ICAO Annex 11. | X | X | X | X | X | X | | |
| **010 07 01 02** | | **General** | | | | | | | | |
| (01) | X | Name the objectives of ~~Air Traffic Services (~~ATS~~)~~. | X | X | X | X | X | X | | |
| (02) | X | Describe the three basic types of ATS~~Air Traffic Services~~. | X | X | X | X | X | X | | |
| (03) | X | Describe the three basic types of ATC~~Air Traffic Control~~ services ~~(ATC)~~. | X | X | X | X | X | X | | |
| ~~LO (04)~~ | | ~~Indicate when aerodrome control towers shall provide an accurate time check to pilots.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| (05) | | State on which frequencies a pilot can expect ~~ATS~~ ATC to contact them in case of an emergency. | X | X | X | X | X | X | | |
| (06) | | Understand the procedure for the transfer of an aircraft from one ATC unit to another. | X | X | X | X | X | | | |
| ***010 07 01 03*** | | ***Airspace*** | | | | | | | | |
| (01) | | Describe the purpose for establishing flight information regions (FIRs) including upper flight information regions (UIRs). | X | X | X | X | X | X | | |
| (02) | | Understand the various rules and services that apply to the various classes of airspace. | X | X | X | X | X | X | X | |
| (03) | | Explain which airspace shall be included in an FIR or UIR. | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (04) | | State the designation for those portions of the airspace where flight information service (FIS) and alerting service shall be provided. | X | X | X | X | X | X | | |
| (05) | | State the designations for those portions of the airspace where ATC service shall be provided. | X | X | X | X | X | X | | |
| (06) | | Indicate whether or not control areas (CTAs) and control zones (CTRs) designated within an FIR shall form part of that FIR. | X | X | X | X | X | X | | |
| (07) | | Name the lower limit of a CTA as far as ICAO standards are concerned. | X | X | X | X | X | X | | |
| (08) | | State whether or not the lower limit of a CTA has to be established uniformly. | X | X | X | X | X | X | | |
| (09) | | Explain why a UIR or u~~U~~pper CTA should be delineated to include the u~~U~~pper a~~A~~irspace within the lateral limits of a number of lower FIRs or CTAs. | X | X | X | X | X | X | | |
| (10) | | Describe in general the lateral limits of CTRs. | X | X | X | X | X | X | | |
| (11) | | State the minimum extension (in NM) of the lateral limits of a CTR. | X | X | X | X | X | X | | |
| (12) | | State the upper limits of a CTR located within the lateral limits of a CTA. | X | X | X | X | X | X | | |
| ***010 07 01 04*** | | ***Air t~~T~~raffic c~~C~~ontrol (ATC) services*** | | | | | | | | |
| (01) | | Name all classes of airspace in which ATC shall be provided. | X | X | X | X | X | X | | |
| (02) | | Name the ATS units providing ATC service (area control service, approach control service, aerodrome control | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | service). | | | | | | | | |
| (03) | | Describe which unit(s) may be assigned with the task to provide specified services on the apron. | X | X | X | X | X | X | X | |
| (04) | | Name the purpose of clearances issued by an ATC unit. | X | X | X | X | X | X | X | |
| ~~LO (05)~~ | | ~~Describe the aim of clearances issued by ATC with regard to IFR, VFR or special VFR flights, and refer to the different airspaces.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | No practical use |
| (06) | | List the various (five possible) parts of an ATC clearance. | X | X | X | X | X | X | X | |
| ~~LO (07)~~ | | ~~Describe the various aspects of clearance coordination.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| ~~LO (08)~~ | | ~~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.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | No practical use |
| (09) | | Explain why the movement of persons, vehicles and towed aircraft on the manoeuvring area of an AD shall be controlled by the ~~AD~~ aerodrome control tower (TWR) (as necessary). | X | X | X | X | X | X | | |
| ***010 07 01 05*** | | ***Flight i~~I~~nformation s~~S~~ervice (FIS)*** | | | | | | | | |
| (01) | X | State for which aircraft FIS shall be provided. | X | X | X | X | X | X | | |
| (02) | X | State whether or not FIS shall include the provision of pertinent significant meteorological information (SIGMET) and air meteorological information report (AIRMET) | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | information. | | | | | | | | |
| (03) | X | State which information FIS shall include in addition to SIGMET and AIRMET information. | X | X | X | X | X | X | | |
| (04) | X | Indicate which other information the FIS shall include in addition to the special information given in Annex~~NNEX~~ 11. | X | X | X | X | X | X | | |
| ~~LO (05)~~ | | ~~Name the three major types of operational FIS broadcasts.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| (06) | X | Give the meaning of the acronym 'ATIS' in plain language. | X | X | X | X | X | X | | |
| ~~LO (07)~~ | | ~~Show that you are acquainted with the basic conditions for transmitting an ATIS as indicated in ANNEX 11.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| ~~LO (08)~~ | | ~~Mention the four possible ATIS messages.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| (09) | | List the basic information concerning automatic terminal information service (ATIS) broadcasts (e.g. frequencies used, number of ADs included, updating, identification, acknowledgment of receipt, language and channels, ALT-setting). | X | X | X | X | X | X | | |
| (10) | | Understand the content of an ATIS message ~~and the factors involved~~. | X | X | X | X | X | | | |
| (11) | | State the reasons and circumstances when an ATIS message shall be updated. | X | X | X | X | X | X | | |
| ***010 07 01 06*** | | ***Alerting service*** | | | | | | | | |
| (01) | | Indicate who provides the alerting service. | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (02) | | State who is responsible for initiating the appropriate emergency phase. | X | X | X | X | X | | | |
| (03) | | Indicate the aircraft to which alerting service shall be provided. | X | X | X | X | X | | | |
| (04) | | Name the unit which shall be notified by the responsible ATS unit immediately when an aircraft is considered to be in a state of emergency. | X | X | X | X | X | | | |
| (05) | | Name the three stages of emergency and describe the basic conditions for each kind of emergency. | X | X | X | X | X | | | |
| (06) | X | ~~Demonstrate knowledge of~~ State the meaning of the expressions INCERFA, ALERFA and DETRESFA. | X | X | X | X | X | | | |
| (07) | X | Describe the limiting conditions for the information of aircraft in the vicinity of an aircraft being in a state of emergency. | X | X | X | X | X | | | |
| ***010 07 01 07*** | | ***Principles governing required navigation performance (RNP) and air traffic services (ATS) route designators*** | | | | | | | | |
| (01) | | State the meaning of the expression~~s~~ RNP ~~4, RNP 1, etc~~. | X | X | X | X | X | | | |
| (02) | | State the factors that RNP is based on. | X | X | X | X | X | | | |
| (03) | X | Describe the reason for establishing a system of route designators and ~~Required Navigation Performance (~~RNP~~)~~. | X | X | X | X | X | | | |
| (04) | | State whether or not a prescribed RNP type is considered an integral part of the ATS route designator. | X | X | X | X | X | | | |
| (05) | | Demonstrate general knowledge of the composition of an ATS route designator. | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **010 07 02 00** | | **ICAO Doc~~ument~~ 4444 — Air Traffic Management** | | | | | | | | |
| ***010 07 02 01*** | | ***Foreword (Scope and purpose)*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain in plain language the meaning of the acronym 'PANS-ATM'.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| ~~LO (02)~~ | | ~~State whether or not the procedures prescribed in ICAO Doc 4444 are directed exclusively to ATS services personnel.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| ~~LO (03)~~ | | ~~Describe the relationship between ICAO Doc 4444 and other documents.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| (04) | | State whether or not a clearance issued by an ATS ~~ATC~~ unit~~s~~ does include prevention of collision with terrain, and if there is an exception to this, name the exception. | X | X | X | X | X | X | X | |
| ***010 07 02 02*** | | ***Definitions*** | | | | | | | | |
| (01) | X | Recall all definitions given in ICAO Doc 4444 except the following:<br>accepting unit/controller, AD taxi circuit, aeronautical fixed service (AFS), aeronautical fixed station, air-taxiing, allocation, approach funnel, assignment, data convention, data processing, discrete code, D-value, flight status, ground effect, receiving unit/controller, sending unit/controller, transfer of control point, transferring unit/controller, unmanned free balloon. | X | X | X | X | X | X | | |
| ***010 07 02 03*** | | ***ATS system capacity and a~~A~~ir t~~T~~raffic f~~F~~low m~~M~~anagement (ATFM)*** | | | | | | | | |
| (01) | X | Explain when and where ATFM service shall be | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | implemented. | | | | | | | | |
| ***010 07 02 04*** | | ***General provisions for ~~a~~Air t~~T~~raffic s~~S~~ervices (ATS)*** | | | | | | | | |
| (01) | X | Describe who is responsible for the provision of flight information and alerting service within an ~~Flight Information Region (~~FIR~~)~~ within controlled airspace and at controlled ADs~~aerodromes~~. | X | X | X | X | X | X | | |
| ***010 07 02 05*** | | ***ATC clearances*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain 'the sole scope and purpose' of an ATC clearance.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | No practical use |
| (02) | | State which information the issue of an ATC clearance is based on. | X | X | X | X | X | X | X | |
| (03) | | Describe what a PIC should do if an ATC clearance is not suitable. | X | X | X | X | X | X | X | |
| (04) | | Indicate who bears the responsibility for adhering to the applicable rules and regulations whilst flying under the control of an ATC unit. | X | X | X | X | X | X | X | |
| (05) | X | Name the two primary purposes of clearances issued by ATC units. | X | X | X | X | X | X | | |
| (06) | | State why clearances must be issued 'early enough' to en-route aircraft. | X | X | X | X | X | X | | |
| (07) | | Explain what is meant by the expression 'clearance limit'. | X | X | X | X | X | X | X | |
| (08) | | Explain the meaning of the phrases 'cleared via flight planned route', 'cleared via (designation) departure' and 'cleared via (designation) arrival' in an ATC clearance. | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (09) | | List which items of an ATC clearance shall always be read back by the flight crew. | X | X | X | X | X | X | X | |
| ***010 07 02 06*** | | ***Horizontal speed control instructions*** | | | | | | | | |
| (01) | | Explain the reason for speed control by ATC. | X | X | X | X | X | X | X | |
| (02) | X | Define the maximum speed changes that ATC may impose. | X | X | X | X | X | X | X | |
| (03) | | State within which distance from the THR~~threshold~~ the PIC must not expect any kind of speed control. | X | X | X | X | X | X | X | |
| ***010 07 02 07*** | | ***Change from IFR to VFR flight*** | | | | | | | | |
| (01) | | Explain how the change from IFR to VFR can be initiated by the PIC. | X | | X | | | X | X | |
| (02) | | Indicate the expected reaction of the appropriate ATC unit upon a request to change from IFR to VFR. | X | | X | | | X | X | |
| ***010 07 02 08*** | | ***Wake turbulence*** | | | | | | | | |
| (01) | | State the wake-turbulence categories of aircraft. | X | X | X | X | X | X | | |
| (02) | | State the wake-turbulence separation minima. | X | X | X | X | X | X | | |
| (03) | | Describe how a ‘heavy’ aircraft shall indicate this in the initial radio-telephony contact with ATS. | X | X | X | X | X | X | | |
| ***010 07 02 09*** | | ***Altimeter-setting procedures*** | | | | | | | | |
| (01) | | Define the following terms:<br>— TRL~~transition level~~;<br>— transition layer; and | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — TA~~transition altitude~~. | | | | | | | | |
| (02) | | Indicate how the vertical position of an aircraft in the vicinity of an AD~~aerodrome~~ shall be expressed at or below the TA~~transition altitude~~, at or above the TRL~~transition level~~, and while climbing or descending through the transition layer. | X | X | X | X | X | X | X | |
| (03) | | Describe when the HGT~~height~~ of an aircraft using QFE during an NDB approach is referred to the landing THR~~threshold~~ instead of the AD~~aerodrome~~ elevation. | X | X | X | X | X | X | X | |
| (04) | | Indicate how far altimeter settings provided to aircraft shall be rounded up or down. | X | X | X | X | X | X | X | |
| (05) | | Define the expression 'lowest usable FL~~flight level~~'. | X | X | X | X | X | X | X | |
| (06) | | Determine how the vertical position of an aircraft on an en-route flight is expressed at or above the lowest usable FL ~~flight level~~ and below the lowest usable FL~~flight level~~. | X | X | X | X | X | X | X | |
| (07) | | State who establishes the TRL~~transition level~~ to be used in the vicinity of an AD~~aerodrome~~. | X | X | X | X | X | X | X | |
| (08) | | Decide how and when a flight crew member shall be informed about the TRL~~transition level~~. | X | X | X | X | X | X | X | |
| (09) | | State whether or not the pilot can request ~~the~~ TRL~~transition level~~ to be included in the approach clearance. | X | X | X | X | X | X | X | |
| ~~LO (10)~~ | | ~~State in what kind of clearance the QNH altimeter setting shall be included.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | No practical use |
| ***010 07 02 10*** | | ***Position reporting*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | Describe when position reports shall be made by an aircraft flying on routes defined by designated significant points. | X | X | X | X | X | X | X | |
| (02) | | List the six items that are normally included in a voice position report. | X | X | X | X | X | X | X | |
| (03) | X | Name the requirements for using a simplified position report with FL~~flight level~~, next position (and time-over) and ensuing significant points omitted. | X | X | X | X | X | X | X | |
| (04) | | Name the item of a position report which must be forwarded to ATC with the initial call after changing to a new frequency. | X | X | X | X | X | X | X | |
| (05) | | Indicate the item of a position report which may be omitted if secondary surveillance radar (SSR) Mode C is used. | X | X | X | X | X | X | X | |
| (06) | | Explain in which circumstances the indicated airspeed should be included in a position report. | X | X | X | X | X | X | | |
| (07) | | Explain the meaning of the acronym 'ADS'. | X | X | X | X | X | X | | |
| ~~LO (08)~~ | | ~~State to which unit an ADS report shall be made.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| ~~LO (09)~~ | | ~~Describe how ADS reports shall be made.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| (10) | | Describe which expression shall precede the level figures in a position report if the level is reported in relation to 1013.2 hPa (standard pressure). | X | X | X | X | X | X | | |
| ***010 07 02 11*** | | ***Reporting of operational and meteorological information*** | | | | | | | | |
| (01) | | List the occasions when special air reports shall be made. | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***010 07 02 12*** | | ***Separation methods and minima*** | | | | | | | | |
| (01) | | Explain the general provisions for the separation of controlled traffic. | X | | X | | | X | X | |
| (02) | X | Name the different kinds of separation used in aviation. | X | | X | | | X | X | |
| (03) | | Understand the difference between the type of separation provided within the various classes of airspace and the various types of flight. | X | | X | | | X | X | |
| (04) | | State who is responsible for the avoidance of collision with other aircraft when operating in VMC. | X | | X | | | X | X | |
| ~~LO (05)~~ | | ~~State the ICAO documents in which details of current separation minima are prescribed.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | No practical use |
| (06) | | Describe how vertical separation is obtained. | X | | X | | | X | X | |
| (07) | | State the required vertical separation minimum. | X | | X | | | X | X | |
| (08) | | Describe how the cruising levels of aircraft flying to the same destination and in the expected approach sequence are correlated with each other. | X | | X | | | X | X | |
| (09) | | Name the conditions that must be adhered to when two aircraft are cleared to maintain a specified vertical separation between them during climb or descent. | X | | X | | | X | X | |
| (10) | | List the two main methods for horizontal separation. | X | | X | | | X | X | |
| (11) | | Describe how lateral separation of aircraft at the same level may be obtained. | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (12) | | Explain the term 'geographical separation'. | X | | X | | | X | X | |
| (13) | | Describe track separation between aircraft using the same navigation aid or method. | X | | X | | | X | X | |
| (14) | | Describe the three basic means for the establishment of longitudinal separation. | X | | X | | | X | X | |
| ~~LO (15)~~ | | ~~Describe the circumstances under which a reduction in separation minima may be allowed.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | No practical use |
| (16) | | Indicate the standard horizontal radar separation in NM. | X | | X | | | X | X | |
| (17) | | Describe the method of the Mach number technique. | X | X | | | | | | |
| ~~LO (18)~~ | | ~~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.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | Outdated |
| ***010 07 02 13*** | | ***Separation in the vicinity of aerodromes (ADs)*** | | | | | | | | |
| (01) | | Define the expression '~~e~~Essential ~~l~~Local ~~t~~Traffic'. | X | X | X | X | X | X | | |
| (02) | | State which possible decision the PIC may choose to take if ~~departing aircraft are expedited by suggesting a~~ they are~~he is required~~ asked to accept take-off in a direction which is not 'into the wind'. | X | X | X | X | X | X | | |
| (03) | | State the condition to enable ATC to initiate a visual approach for an IFR flight. | X | X | X | X | X | X | X | |
| (04) | | Indicate whether or not separation shall be provided by ATC between an aircraft executing a visual approach and other | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | arriving or departing aircraft. | | | | | | | | |
| (05) | | State in which case, when the flight crew are not familiar with the instrument approach procedure being carried out, only the final approach track has to be forwarded to them by ATC. | X | X | X | X | X | X | X | |
| (06) | | Describe which FL~~flight level~~ should be assigned to an aircraft first arriving over a holding fix for landing. | X | X | X | X | X | X | X | |
| (07) | | ~~Talk about~~ State ~~the~~ which kinds of priority ~~that shall~~ can be ~~given~~ applied to aircraft for ~~a~~ landing. | X | X | X | X | X | X | X | |
| (08) | | Understand the situation when a pilot of an aircraft in an approach sequence indicates their intention to hold for weather improvements. | X | X | X | X | X | X | X | |
| (09) | | Explain the term 'e~~E~~xpected a~~A~~pproach t~~T~~ime' and the procedures for its use. | X | X | X | X | X | X | X | |
| (10) | | State the reasons which could probably lead to the decision to use another take-off or landing direction than the one into the wind. | X | X | X | X | X | X | X | |
| (11) | | Name the possible consequences for a PIC if the 'RWY-in-use' is not considered suitable for the operation involved. | X | X | X | X | X | X | X | |
| ***010 07 02 14*** | | ***Miscellaneous separation procedures*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Be familiar with the separation of aircraft holding flight.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | No practical use |
| ~~LO (02)~~ | | ~~Be familiar with the minimum separation between departing aircraft.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Combined with 010 07 02 14 (03) |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (03) | | Be familiar with the minimum separation between departing and arriving aircraft. | X | X | X | X | X | X | X | |
| (04) | | Be familiar with the non-radar wake-turbulence longitudinal separation minima. | X | X | X | X | X | X | X | |
| (05) | | Know about a clearance to 'maintain own separation' while in VMC. | X | X | X | X | X | X | X | |
| (06) | | Give a brief description of 'essential traffic' and 'essential traffic information'. | X | X | X | X | X | X | X | |
| (07) | | Describe the circumstances under which a reduction in separation minima may be allowed. | X | X | X | X | X | X | X | |
| ***010 07 02 15*** | | ***Arriving and departing aircraft*** | | | | | | | | |
| (01) | | List the elements of information which shall be transmitted to an aircraft as early as practicable if an approach for landing is intended. | X | X | X | X | X | X | X | |
| (02) | | List the information to be transmitted to an aircraft at the commencement of final approach. | X | X | X | X | X | X | X | |
| (03) | | List the information to be transmitted to an aircraft during final approach. | X | X | X | X | X | X | X | |
| (04) | | Acquaint yourself with all the information regarding arriving and/or departing aircraft on parallel or near-parallel RWYs~~runways~~, including knowledge about NTZ and NOZ and the various combinations of parallel arrivals and/or departures. | X | X | X | X | X | X | | |
| (05) | | State the sequence of priority between aircraft landing (or in | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | the final stage of an approach to land) and aircraft intending to depart. | | | | | | | | |
| ~~LO (06)~~ | | ~~Explain the factors that influence the approach sequence.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Unnecessary knowledge |
| (07) | | State the significant changes in the meteorological conditions in the take-off or climb-out area that shall be transmitted without delay to a departing aircraft. | X | X | X | X | X | X | X | |
| ~~LO (08)~~ | | ~~Describe what information shall be forwarded to a departing aircraft as far as visual or non-visual aids are concerned.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Outdated |
| (09) | | State the significant changes that shall be transmitted as early as practicable to an arriving aircraft, particularly changes in the meteorological conditions. | X | X | X | X | X | X | X | |
| ***010 07 02 16*** | | ***Procedures for aerodrome (AD) control service*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Describe the general tasks of the Aerodrome Control Tower (TWR) when issuing information and clearances to aircraft under its control.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | |
| ~~LO (02)~~ | | ~~List for which aircraft and their given positions or flight situations the TWR shall prevent collisions.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | |
| (03) | | Name the operational failure or irregularity of AD equipment which shall be reported to the TWR immediately. | X | X | X | X | X | X | X | |
| (04) | | State that, after a given period of time, the TWR shall report to the area control centre (ACC) or flight information centre (FIC) if an aircraft does not land as expected. | X | X | X | X | X | X | X | |
| (05) | | Describe the procedures to be observed by the TWR whenever VFR operations are suspended. | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (06) | | Explain the term 'RWY-in-use' and its selection. | X | X | X | X | X | X | | |
| (07) | | List the information the TWR should give to an aircraft:<br>— prior to taxiing for take-off;<br>— prior to take-off;<br>— prior to entering the traffic circuit. | X | X | X | X | X | X | | |
| (08) | | Explain that a report of surface wind direction given to a pilot by the TWR is magnetic. | X | X | X | X | X | X | | |
| (09) | | Explain the exact meaning of the expression '~~runway~~ RWY vacated'. | X | X | X | X | X | X | | |
| ***010 07 02 17*** | | ***Radar services*** | | | | | | | | |
| ~~LO (01)~~ | | ~~State to what extent the use of radar in air traffic services may be limited.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | |
| ~~LO (02)~~ | | ~~State what radar-derived information shall be available for display to the controller as a minimum.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | |
| (03) | | Name the two basic identification procedures used with radar. | X | X | X | X | X | X | X | |
| ~~LO (04)~~ | | ~~Define the term 'PSR'.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Too obvious |
| (05) | | Describe the circumstances under which an aircraft provided with radar service should be informed of its position. | X | X | X | X | X | X | X | |
| (06) | | List the possible forms of position information passed on to the aircraft by radar services. | X | X | X | X | X | X | X | |
| (07) | | Define the term 'radar vectoring'. | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ~~LO (08)~~ | | ~~State the aims of radar vectoring as shown in ICAO Doc 4444.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Too obvious |
| (09) | | ~~State~~ Describe how radar vectoring shall be achieved. | X | X | X | X | X | X | X | |
| (10) | | Describe the information which shall be given to an aircraft when radar vectoring is terminated and the pilot is instructed to resume own navigation. | X | X | X | X | X | X | X | |
| (11) | | Explain the procedures for the conduct of s~~S~~urveillance r~~R~~adar a~~A~~pproaches (SRA). | X | X | X | X | X | X | X | |
| (12) | | 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. | X | X | X | X | X | X | X | |
| ***010 07 02 18*** | | ***Air traffic advisory service*** | | | | | | | | |
| (01) | | Describe the objective and basic principles of the air traffic advisory service. | X | X | X | X | X | X | | |
| (02) | | State to which aircraft air traffic advisory service shall be provided. | X | X | X | X | X | X | | |
| (03) | | Explain why air traffic advisory service does not deliver ‘clearances’ but only ‘advisory information’. | X | X | X | X | X | X | | |
| ***010 07 02 19*** | | ***Procedures related to emergencies, communication (COM) failure and contingencies*** | | | | | | | | |
| (01) | | State the mode and code of SSR equipment a pilot might operate in a (general) state of emergency or (specifically) in case the aircraft is subject to unlawful interference. | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (02) | | State the special rights an aircraft in a state of emergency can expect from ATC. | X | X | X | X | X | X | X | |
| (03) | | Describe the expected action of aircraft after receiving a broadcast from ATS concerning the emergency descent of an aircraft. | X | X | X | X | X | X | X | |
| (04) | | State how it can be ascertained, in case of a failure of two-way COM~~communication~~, whether the aircraft is able to receive transmissions from the ATS unit. | X | X | X | X | X | X | X | |
| ~~LO (05)~~ | | ~~Explain the assumption based on which separation shall be maintained if an aircraft is known to experience a COM failure in VMC or in IMC.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Unnecessary knowledge |
| (06) | | State on which frequencies appropriate information, for an aircraft encountering two-way COM failure, shall be sent by ATS. | X | X | X | X | X | X | X | |
| ~~LO (07)~~ | | ~~Describe the expected actions of an ATS unit after having been informed that an aircraft is being intercepted in or outside its area of responsibility.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Unnecessary knowledge |
| (08) | | State what is meant by the expression ‘strayed aircraft’ and ‘unidentified aircraft’. | X | X | X | X | X | X | X | |
| (09) | | Explain the minimum level for fuel-dumping and the reasons for this. | X | X | X | X | X | X | | |
| (10) | | Explain the possible request of ATC to an aircraft to change its radio-telephone (RTF) call sign. | X | X | X | X | X | X | | |
| ***010 07 02 20*** | | ***Miscellaneous procedures*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | Explain the meaning of 'AIRPROX'. | X | X | X | X | X | X | | |
| (02) | | Determine the task of an air traffic incident report. | X | X | X | X | X | X | | |
| **010 08 00 00** | | **AERONAUTICAL INFORMATION SERVICE (AIS)** | | | | | | | | |
| **010 08 01 00** | | **Introduction** | | | | | | | | |
| (01) | | State, in general terms, the objective of AIS ~~the Aeronautical Information Service~~. | X | X | X | X | X | X | | |
| **010 08 02 00** | | **Definitions of ICAO Annex 15** | | | | | | | | |
| (01) | | Recall the following definitions:<br>a~~A~~eronautical i~~I~~nformation c~~C~~ircular (AIC), a~~A~~eronautical i~~I~~nformation p~~P~~ublication (AIP), AIP amendment, AIP supplement, aeronautical information regulation and control (AIRAC), danger area, Integrated Aeronautical Information Package, international airport, international NOTAM office (NOF), manoeuvring area, movement area, NOTAM, p~~P~~re-flight i~~I~~nformation b~~B~~ulletin (PIB), prohibited area, restricted area, SNOWTAM, ASHTAM. | X | X | X | X | X | X | X | |
| **010 08 03 00** | | **General** | | | | | | | | |
| (01) | | State during which period of time AIS~~aeronautical information service~~ shall be available with reference to an aircraft flying in the area of responsibility of an AIS, provided a 24-hour service is not available. | X | X | X | X | X | X | | |
| (02) | | Name (in general) the kind of aeronautical information/data which an AIS service shall make available in a suitable form | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | to flight crews. | | | | | | | | |
| (03) | | Summarise the duties of AIS~~aeronautical information service~~ concerning aeronautical information data for the territory of ~~the~~ a particular State. | X | X | X | X | X | X | | |
| ~~LO (04)~~ | | ~~Understand the principles of WGS 84.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | Covered in 061 |
| **010 08 04 00** | | **Integrated Aeronautical Information Package** | | | | | | | | |
| (01) | | Name the different elements that make up an Integrated Aeronautical Information Package. | X | X | X | X | X | X | | |
| ***010 08 04 01*** | | ***Aeronautical ~~i~~Information p~~P~~ublication (AIP)*** | | | | | | | | |
| (01) | | State the primary purpose of the AIP. | X | X | X | X | X | X | | |
| (02) | | Name the different parts of the AIP. | X | X | X | X | X | X | | |
| (03) | | ~~State~~ Be aware of the ~~in which~~ main parts of the AIP where the following information can be found:<br>— differences from the ICAO Standards, Recommended Practices and Procedures;<br>— location indicators, AISS~~aeronautical information services~~, minimum flight ALT~~altitude~~, meteorological information for aircraft in flight (VOLMET) service, SIGMET service;<br>— general rules and procedures (especially general rules, VFR, IFR, ALT-setting procedure, interception of civil aircraft, unlawful interference, air traffic incidents);<br>— ATS airspace (especially FIR, UIR, TMA); | X | X | X | X | X | X | X | The AIP has indexes and this is unnecessary knowledge |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — ATS routes (especially lower ATS routes, upper ATS routes, area navigation routes);<br>— AD~~aerodrome~~ data including aprons, taxiways (TWYs) and check locations/positions data;<br>— navigation warnings (especially prohibited, restricted and danger areas);<br>— aircraft instruments, equipment and flight documents;<br>— AD surface movement guidance and control system and markings;<br>— RWY physical characteristics, declared distances, approach (APP) and RWY lighting;<br>— AD radio navigation and landing aids;<br>— charts related to an AD;<br>— entry, transit and departure of aircraft, passengers, crew and cargo, and the significance of this information to aircrew. | | | | | | | | |
| (04) | | State how permanent changes to the AIP shall be published. | X | X | X | X | X | X | | |
| (05) | | Explain what kind of information shall be published in the form of AIP s~~S~~upplements. | X | X | X | X | X | X | | |
| ~~LO (06)~~ | | ~~Describe how conspicuousness of AIP Supplement pages is achieved.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| ***010 08 04 02*** | | ***Notices to airmen (NOTAMs)*** | | | | | | | | |
| (01) | | Describe how information shall be published which in principle would belong to NOTAMs but includes extensive | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | text and/or graphics. | | | | | | | | |
| (02) | | Summarise the essential information which leads to the issu~~anc~~e of a NOTAM. | X | X | X | X | X | X | X | |
| (03) | | State to whom NOTAMs shall be distributed. | X | X | X | X | X | X | | |
| (04) | | Explain how information regarding snow, ice and standing water on AD pavements shall be reported. | X | X | X | X | X | X | X | |
| (05) | | Describe the means by which NOTAMs shall be distributed. | X | X | X | X | X | X | | |
| (06) | | Define and s~~S~~tate which information an ASHTAM may contain. | X | X | X | X | X | X | | |
| ***010 08 04 03*** | | ***Aeronautical i~~I~~nformation r~~R~~egulation and c~~C~~ontrol (AIRAC)*** | | | | | | | | |
| (01) | X | List the circumstances under which the information concerned shall or should be distributed as AIRAC. | X | X | X | X | X | X | X | |
| ~~LO (02)~~ | | ~~State the sequence in which AIRACs shall be issued and state how many days before the effective date the information shall be distributed by AIS.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | No practical use |
| ***010 08 04 04*** | | ***Aeronautical i~~I~~nformation c~~C~~irculars (AICs)*** | | | | | | | | |
| (01) | X | Describe the ~~reasons for the publication of~~ type of information that may be published in AICs. | X | X | X | X | X | X | | |
| (02) | | Explain the organisation and standard colour codes of AICs. | X | X | X | X | X | X | | |
| ~~LO (03)~~ | | ~~Explain the normal publication cycle of AICs.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| ***010 08 04 05*** | | ***Pre-flight and post-flight information/data*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ~~LO (01)~~ | | ~~List (in general) which details shall be included in the aeronautical information provided for pre-flight planning purposes at the appropriate ADs.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | Too vague |
| (02) | | Summarise the additional current information relating to the AD of departure that shall be provided as pre-flight information. | X | X | X | X | X | X | | |
| (03) | | Describe how a recapitulation of current NOTAM and other information of urgent character shall be made available to flight crews. | X | X | X | X | X | X | X | |
| (04) | | State which post-flight information from aircrews shall be submitted to AIS for distribution as required by the circumstances. | X | X | X | X | X | X | | |
| **010 08 05 00 (New)** | | **ATM service providers** | | | | | | | | New subtopic |
| (01) New | | Explain the main content of Regulation (EU) No 1035/2011. | X | | X | X | | | | |
| **010 09 00 00** | | **AERODROMES (ICAO Annex 14, Volume I — Aerodrome Design and Operations, and Regulation (EU) No 139/2014)** | | | | | | | | |
| **010 09 01 00** | | **General** | | | | | | | | |
| ~~LO (01)~~ | | ~~Recognise all definitions of ICAO Annex 14 **except** the following:~~<br>~~accuracy, cyclic redundancy check, data quality, effective intensity, ellipsoid height (geodetic height), geodetic datum, geoid, geoid undulation, integrity (aeronautical data), light failure, lighting system reliability, orthometric height,~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | The definitions are not required knowledge for this level |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ~~station declination, usability factor, Reference code.~~ | | | | | | | | |
| (02) | | Describe, in general terms, the intent of the AD reference code as well as its composition of two elements. | X | X | X | X | X | X | | |
| **010 09 02 00** | | **Aerodrome (AD) data** | | | | | | | | |
| ***010 09 02 01*** | | ***Aerodrome (AD) reference point*** | | | | | | | | |
| (01) | | Describe where the AD~~aerodrome~~ reference point shall be located and where it shall normally remain. | X | X | X | X | X | X | X | |
| ***010 09 02 02*** | | ***Pavement strengths*** | | | | | | | | |
| (01) | | Explain the terms pavement classification number (PCN) and aircraft classification number (ACN), and describe their mutual dependence. | X | X | X | X | X | X | | |
| (02) | | Describe how the bearing strength for an aircraft with an apron mass equal to or less than 5 700 kg shall be reported. | X | X | X | X | X | X | | |
| ***010 09 02 03*** | | ***Declared distances*** | | | | | | | | |
| (01) | | List the four most important declared RWY distances and indicate where you can find guidance on their calculation in ICAO Annex 14. | X | X | X | X | X | X | | |
| (02) | | Recall the definitions for the four main declared distances. | X | X | X | X | X | X | | |
| ***010 09 02 04*** | | ***Condition of the movement area and related facilities*** | | | | | | | | |
| (01) | | Understand the purpose of informing AIS and ATS units about the condition of the movement area and related facilities. | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (02) | | List the matters of operational significance or affecting aircraft performance which should be reported to AIS and ATS units to be transmitted to aircraft involved. | X | X | X | X | X | X | | |
| (03) | | Describe the ~~four~~ three different types of water deposit on RWYs~~runways~~. | X | X | X | X | X | X | | |
| (04) | | Name the ~~three~~ four defined states of frozen water on the RWY. | X | X | X | X | X | X | | |
| (05) | | Understand the five levels of braking action including the associated coefficients and codes. | X | X | X | X | X | | | |
| **010 09 03 00** | | **Physical characteristics** | | | | | | | | |
| ***010 09 03 01*** | | ***Runways (RWYs)*** | | | | | | | | |
| (01) | | Describe where a THR~~threshold~~ should normally be located. | X | X | X | X | X | X | | |
| (02) | | Acquaint yourself with the general considerations concerning RWYs~~runways~~ associated with a stopway (SWY) or clearway (CWY). | X | X | X | X | X | X | X | |
| ~~LO (03)~~ | | ~~State where in Annex 14 you can find detailed information about the required runway width dependent upon code number and code letter.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| ***010 09 03 02*** | | ***Runway (RWY) strips*** | | | | | | | | |
| (01) | | Explain the term 'RWY~~runway~~ strip'. | X | X | X | X | X | X | X | |
| ***010 09 03 03*** | | ***RWY~~Runway~~-end safety area*** | | | | | | | | |
| (01) | | Explain the term 'RWY-end safety area'. | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***010 09 03 04*** | | ***Clearway (CWY)*** | | | | | | | | |
| (01) | | Explain the term 'CWY~~clearway~~'. | X | X | X | X | X | X | X | |
| ***010 09 03 05*** | | ***Stopway (SWY)*** | | | | | | | | |
| (01) | | Explain the term 'SWY~~stopway~~'. | X | X | X | X | X | X | X | |
| ***~~010 09 03 06~~*** | | ***~~Radio altimeter operating area~~ Intentionally left blank*** | | | | | | | | Outdated |
| ~~LO (01)~~ | | ~~Describe where a radio altimeter operating area should be established and how far it should extend laterally and longitudinally.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| ***010 09 03 07*** | | ***Taxiways (TWYs)*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Describe the condition which must be fulfilled to maintain the required clearance between the outer main wheels of an aircraft and the edge of the taxiway.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| (02) | | Describe the reasons and the requirements for rapid-exit TWY~~taxiways~~. | X | X | X | X | X | X | | |
| (03) | | State the reason for a TWY~~taxiway~~ widening in curves. | X | X | X | X | X | X | | |
| (04) | | Explain when and where holding bays should be provided. | X | X | X | X | X | X | | |
| (05) | | Describe where RWY~~runway~~-holding positions shall be established. | X | X | X | X | X | X | X | |
| (06) | | Define the term 'road-holding position'. | X | X | X | X | X | X | | |
| (07) | | Describe where intermediate TWY~~taxiway~~-holding positions should be established. | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **010 09 04 00** | | **Visual aids for navigation** | | | | | | | | |
| ***010 09 04 01*** | | ***Indicators and signalling devices*** | | | | | | | | |
| (01) | | Describe the wind-direction indicators with which ADs shall be equipped. | X | X | X | X | X | X | | |
| ~~LO (02)~~ | | ~~Describe a landing direction indicator.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | Outdated |
| (03) | | Explain the capabilities of a signalling lamp. | X | X | X | X | X | X | | |
| (04) | X | State which characteristics a signal area should have. | X | X | X | X | X | X | | |
| (05) | X | Interpret all indications and signals that may be used in a signals area. | X | X | X | X | X | X | | |
| ***010 09 04 02*** | | ***Markings*** | | | | | | | | |
| (01) | | Name the colours used for the various markings (RWY, TWY, aircraft stands, apron safety lines). | X | X | X | X | X | X | X | |
| (02) | | State where a RWY designation marking shall be provided and how it is designed. | X | X | X | X | X | X | | |
| (03) | | Describe the application and characteristics of:<br>— RWY-centre-line markings;<br>— THR marking;<br>— touchdown-zone (TDZ) marking;<br>— RWY-side-stripe marking;<br>— TWY-centre-line marking;<br>— RWY~~runway~~-holding position marking;<br>— intermediate holding position marking; | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — aircraft-stand markings;<br>— apron safety lines;<br>— road-holding position marking;<br>— mandatory instruction marking;<br>— information marking. | | | | | | | | |
| ***010 09 04 03*** | | ***Lights*** | | | | | | | | |
| (01) | | Describe the mechanical safety considerations regarding elevated approach lights and elevated RWY, SWY~~stopway~~ and TWY~~taxiway~~ lights. | X | X | X | X | X | X | X | |
| ~~LO (02)~~ | | ~~Describe the relationship of the intensity of RWY lighting, the approach lighting system and the use of a separate intensity control for different lighting systems.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | No practical use |
| (03) | | List the conditions for the installation of an ~~AD~~ aerodrome beacon (ABN) and describe its general characteristics. | X | X | X | X | X | X | X | |
| (04) | | Name the different kinds of operations for which a simple approach~~APP~~ lighting system shall be used. | X | X | X | X | X | X | X | |
| (05) | | Describe the basic installations of a simple approach~~APP~~ lighting system including the dimensions and distances normally used. | X | X | X | X | X | X | X | |
| (06) | | Describe the principle of a precision approach~~APP~~ category I lighting system including information such as location and characteristics.<br>*Remark: This includes the 'Calvert' system with additional crossbars.* | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (07) | | Describe the principle of a precision approach~~APP~~ category II and III lighting system including information such as location and characteristics, especially mentioning the inner 300 m of the system. | X | | | | | | | |
| (08) | | Describe the wing bars of precision approach path indicator (PAPI) and abbreviated precision approach path indicator (APAPI). | X | X | X | X | X | X | X | |
| ~~LO (09)~~ | | ~~Interpret what the pilot will see during approach using PAPI, APAPI, T-VASIS and AT-VASIS.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Unnecessary knowledge |
| (10) | | Interpret what the pilot will see during approach using helicopter approach path indicator (HAPI). | | | X | X | X | | | |
| (11) | | Explain the application and characteristics of:<br>— RWY-edge lights;<br>— RWY-THR~~threshold~~ and wing-bar lights;<br>— RWY-end lights;<br>— RWY-centre-line lights;<br>— RWY-lead-in lights;<br>— RWY-TDZ~~touchdown zone~~ lights;<br>— SWY~~stopway~~ lights;<br>— TWY~~taxiway~~-centre-line lights;<br>— TWY~~taxiway~~-edge lights;<br>— stop bars;<br>— intermediate holding position lights;<br>— RWY-guard lights; | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — road-holding position lights. | | | | | | | | |
| (11) | | Understand the timescale within which aeronautical ground lights shall be made available to arriving aircraft. | X | X | X | X | X | | | |
| ***010 09 04 04*** | | ***Signs*** | | | | | | | | |
| ~~LO (01)~~ | | ~~State the general purpose for installing signs.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Too obvious |
| (02) | | Explain which signs are the only ones on the movement area utilising red. | X | X | X | X | X | X | X | |
| (03) | | List the provisions for illuminating signs. | X | X | X | X | X | X | X | |
| ~~LO (04)~~ | | ~~State the purpose for installing mandatory instruction signs.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | |
| (05) | | Name the kind of signs which shall be included in the mandatory instruction signs. | X | X | X | X | X | X | X | |
| (06) | | Name the colours used for mandatory instruction signs. | X | X | X | X | X | X | X | |
| (07) | | Describe by which sign a pattern 'A' RWY~~runway~~ holding position (i.e. at an intersection of a TWY~~taxiway~~ and a non-instrument, non-precision approach or take-off RWY) marking shall be supplemented. | X | X | X | X | X | X | | |
| (08) | | Describe by which sign a pattern 'B' RWY~~runway~~ holding position (i.e. at an intersection of a TWY~~taxiway~~ and a precision approach RWY) marking shall be supplemented. | X | X | X | X | X | X | | |
| (09) | | Describe the location of:<br>— a RWY designation sign at a TWY~~taxiway~~/RWY intersection;<br>— a 'NO ENTRY' sign; | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — a RWY-holding position sign. | | | | | | | | |
| (10) | | Name the sign with which it shall be indicated that a taxiing aircraft is about to infringe an obstacle limitation surface or to interfere with the operation of radio navigation aids (e.g. ILS/MLS critical/sensitive area). | X | X | X | X | X | X | X | |
| (11) | | Describe the various possible inscriptions on RWY designation signs and on holding position signs. | X | X | X | X | X | X | X | |
| (12) | | Describe the inscription on an intermediate holding position sign on a TWY~~taxiway~~. | X | X | X | X | X | X | X | |
| ~~LO (13)~~ | | ~~State when information signs shall be provided.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| (14) | | Describe the colours used in connection with information signs. | X | X | X | X | X | X | | |
| (15) | | Describe the possible inscriptions on information signs. | X | X | X | X | X | X | | |
| (16) | | Explain the application, location and characteristics of aircraft stand identification signs. | X | X | X | X | X | X | | |
| (17) | | Explain the application, location and characteristics of road-holding position signs. | X | X | X | X | X | X | | |
| ***010 09 04 05*** | | ***Markers*** | | | | | | | | |
| (01) | | Explain why markers located near a RWY~~runway~~ or TWY~~taxiway~~ shall be limited to their HGT~~height~~. | X | X | X | X | X | X | | |
| (02) | | Explain the application and characteristics of:<br>— unpaved RWY-edge markers;<br>— TWY-edge markers; | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — TWY-centre-line markers;<br>— unpaved TWY-edge markers;<br>— boundary markers;<br>— SWY~~stopway~~-edge markers. | | | | | | | | |
| **010 09 05 00** | | **Visual aids for denoting obstacles** | | | | | | | | |
| ***010 09 05 01*** | | ***Marking of objects*** | | | | | | | | |
| (01) | | State how fixed or mobile objects shall be marked if colouring is not practicable. | X | X | X | X | X | X | | |
| (02) | | Describe marking by colours (fixed or mobile objects). | X | X | X | X | X | X | | |
| (03) | | Explain the use of markers for the marking of objects, overhead wires, cables, etc. | X | X | X | X | X | X | | |
| (04) | | Explain the use of flags for the marking of objects. | X | X | X | X | X | X | | |
| ***010 09 05 02*** | | ***Lighting of objects*** | | | | | | | | |
| (01) | | Name the different types of lights to indicate the presence of objects which must be lighted. | X | X | X | X | X | X | | |
| ~~LO (02)~~ | | ~~State the time period(s) of the 24 hours of a day during which high-intensity lights are intended for use.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| (03) | | Describe (in general terms) the location of obstacle lights. | X | X | X | X | X | X | | |
| (04) | | Describe (in general and for normal circumstances) the colour and sequence of low-intensity obstacle lights, medium-intensity obstacle lights and high-intensity obstacle lights. | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (05) | | State where you can find information about lights to be displayed by aircraft. | X | X | X | X | X | X | | |
| **010 09 06 00** | | **Visual aids for denoting restricted use of areas** | | | | | | | | |
| (01) | | Describe the colours and meaning of 'closed markings' on RWYs and TWYs~~taxiways~~. | X | X | X | X | X | X | | |
| (02) | | State how the pilot of an aircraft moving on the surface of a TWY~~taxiway~~, holding bay or apron shall be warned that the shoulders of these surfaces are 'non-load-bearing'. | X | X | X | X | X | X | | |
| (03) | | Describe the pre-THR~~threshold~~ marking (including colours) when the surface before the THR~~threshold~~ is not suitable for normal use by aircraft. | X | X | X | X | X | X | | |
| **010 09 07 00** | | **Aerodromes (AD) operational services, equipment and installations** | | | | | | | | |
| ***010 09 07 01*** | | ***Rescue and f~~F~~irefighting (RFF)*** | | | | | | | | |
| (01) | | Name the principal objective of an RFF~~rescue and firefighting~~ service. | X | X | X | X | X | X | | |
| ~~LO (02)~~ | | ~~List the most important factors bearing on effective rescue in a survivable aircraft accident.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| (03) | | Explain the basic information the AD category (for RFF~~rescue and firefighting~~) depends upon. | X | X | X | X | X | X | | |
| (04) | | Describe what is meant by the term 'response time', and state its normal and maximum limits. | X | X | X | X | X | X | | |
| ~~LO (05)~~ | | ~~State the reasons for emergency access roads and for~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ~~satellite fire fighting stations.~~ | | | | | | | | |
| ***010 09 07 02*** | | ***Apron management service*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Describe the reason for providing a special apron management service and state what has to be observed if the AD control tower is not participating in the apron management service.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | No practical use |
| (02) | | State who has a right-of-way against vehicles operating on an apron. | X | X | X | X | X | X | | |
| ***010 09 07 03*** | | ***Ground-servicing of aircraft*** | | | | | | | | |
| (01) | | Describe the necessary actions during the ground-servicing of an aircraft with regard to the possible event of a fuel fire. | X | X | X | X | X | X | | |
| **010 09 08 00** | | **Attachment A to ICAO Annex 14, Volume 1 — Supplementary Guidance Material** | | | | | | | | |
| ***010 09 08 01*** | | ***Declared distances*** | | | | | | | | |
| (01) | | List the four types of 'declared distances' on a RWY~~runway~~ and also the appropriate abbreviations. | X | X | X | X | X | X | | |
| (02) | | Explain the circumstances which lead to the situation that the four declared distances on a RWY~~runway~~ are equal to the length of the RWY~~runway~~. | X | X | X | X | X | X | | |
| (03) | | Describe the influence of a CWY~~clearway~~, SWY~~stopway~~ and/or displaced THR~~threshold~~ upon the four 'declared distances'. | X | X | X | X | X | X | | |
| ***010 09 08 02*** | | ~~***Radio altimeter operating areas***~~ ***Intentionally left blank*** | | | | | | | | Outdated |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ~~LO (01)~~ | | ~~Describe the purpose of a radio-altimeter operating area.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| ~~LO (02)~~ | | ~~Describe the physical characteristics of a radio-altimeter operating area.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| ~~LO (03)~~ | | ~~Describe the dimensions of a radio-altimeter operating area.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| ~~LO (04)~~ | | ~~Describe the position of a radio-altimeter operating area.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | |
| ***010 09 08 03*** | | ***Approach lighting systems*** | | | | | | | | |
| (01) | | Name the two main groups of approach lighting systems. | X | X | X | X | X | X | X | |
| (02) | | Describe the two different versions of a simple approach lighting system. | X | X | X | X | X | X | X | |
| (03) | | Describe the two different basic versions of precision approach lighting systems for CAT I. | X | X | X | X | X | X | X | |
| (04) | | Describe the diagram of the inner 300 m of the precision approach lighting system in the case of CAT II and III. | X | | | | | | | |
| (05) | | Describe how the arrangement of an approach lighting system and the location of the appropriate THR~~threshold~~ are interrelated ~~between each other~~. | X | X | X | X | X | X | X | |
| **010 10 00 00** | | **FACILITATION (ICAO Annex 9)** | | | | | | | | **ICAO exam** |
| **010 10 01 00** | | **General** | | | | | | | | |
| ***010 10 01 01*** | | ***~~Foreword~~ Intentionally left blank*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the aim of ANNEX 9 as indicated in the Foreword.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ***010 10 01 02*** | | ***~~Definitions (ICAO Annex 9)~~ Intentionally left blank*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ~~LO (01)~~ | | ~~Understand the definitions.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| **010 10 02 00** | | **Entry and departure of aircraft** | | | | | | | | |
| ***010 10 02 01*** | | ***General d~~D~~eclaration*** | | | | | | | | |
| (01) | | Describe the purpose and use of aircraft documents — as regards ~~far as the~~ 'g~~G~~eneral d~~D~~eclaration' ~~is concerned~~. | X | X | X | X | X | | | |
| (02) | | State whether or not a 'g~~G~~eneral d~~D~~eclaration' will be required by a Contracting State under normal circumstances. | X | X | X | X | X | | | |
| (03) | | State the kind of information concerning crew members whenever a 'g~~G~~eneral d~~D~~eclaration' is required by a Contracting State. | X | X | X | X | X | | | |
| ***010 10 02 02*** | | ***Entry and departure of crew*** | | | | | | | | |
| (01) | | Explain entry requirements for crew. | X | X | X | X | X | | | |
| (02) | | Explain the reasons for the use of c~~C~~rew m~~M~~ember c~~C~~ertificates (CMC) for flight crews and cabin attendants engaged in i~~I~~nternational a~~A~~ir t~~T~~ransport. | X | X | X | X | X | | | |
| (03) | | Explain in which cases Contracting States shall accept the CMC as an identity document instead of a passport or visa. | X | X | X | X | X | | | |
| ~~LO (04)~~ | | ~~State whether the entry privileges for crews of scheduled international air services can be extended to other flight crews of aircraft operated for remuneration or hire but not engaged in scheduled International Air Services.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |
| ***010 10 02 03*** | | ***Entry and departure of passengers and baggage*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | Explain the entry requirements for passengers and their baggage. | X | X | X | X | X | | | |
| (02) | | Explain the requirements and documentation for unaccompanied baggage. | X | X | X | X | X | | | |
| (03) | | Be familiar with the documentation required for the departure and entry of passengers and their baggage. | X | X | X | X | X | | | |
| (04) | | ~~Be familiar with~~Explain the arrangements in the event of a passenger being declared an inadmissible person. | X | X | X | X | X | | | |
| (05) | | Describe the pilot's authority towards unruly passengers. | X | X | X | X | X | | | |
| ***010 10 02 04*** | | ***Entry and departure of cargo*** | | | | | | | | |
| (01) | | Explain the entry requirements for cargo. | | | | | | | | |
| ~~LO (02)~~ | | ~~Be familiar with the documentation required for the entry and departure of cargo.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| **010 11 00 00** | | **SEARCH AND RESCUE (SAR)** | | | | | | | | |
| **010 11 01 00** | | **Essential ~~Search and Rescue (~~SAR~~)~~ definitions of~~in~~ ICAO Annex 12** | | | | | | | | |
| (01) | | Define the following terms:<br>alert phase, distress phase, emergency phase, operator, PIC~~pilot-in-command~~, rescue coordination centre, State of R~~r~~egistry, uncertainty phase. | X | X | X | X | X | | | |
| **010 11 02 00** | | **Organisation** | | | | | | | | |
| (01) | | Describe how ICAO Contracting States shall arrange for the | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | establishment and prompt provisions of SAR services. | | | | | | | | |
| (02) | | Explain the establishment of SAR ~~Regions~~ by Contracting States. | X | X | X | X | X | | | |
| (03) | | Describe the areas within which SAR services shall be established by Contracting States. | X | X | X | X | X | | | |
| (04) | | State the period of time per day within which SAR services shall be available. | X | X | X | X | X | | | |
| (05) | | Describe for which areas rescue coordination centres shall be established. | X | X | X | X | X | | | |
| **010 11 03 00** | | **Operating procedures for non-SAR crews** | | | | | | | | |
| (01) | | Explain the SAR operating procedures for the PIC~~pilot-in-command~~ who arrives first at the scene of an accident. | X | X | X | X | X | | | |
| (02) | | Explain the SAR operating procedures for the PIC~~pilot-in-command~~ intercepting a distress transmission. | X | X | X | X | X | | | |
| **010 11 04 00** | | **Search and rescue signals** | | | | | | | | |
| (01) | | Explain the 'ground–air visual signal code' for use by survivors. | X | X | X | X | X | | | |
| (02) | | Explain the signals to be used for 'air–ground signals'. | X | X | X | X | X | | | |
| **010 12 00 00** | | **SECURITY — Safeguarding International Civil Aviation against Acts of Unlawful Interference (ICAO Annex 17)** | | | | | | | | **ICAO exam** |
| **010 12 01 00** | | **Essential definitions of ICAO Annex 17** | | | | | | | | |
| (01) | | Define the following terms: | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | airside, aircraft security check, screening, security, security control, security-restricted area, unidentified baggage. | | | | | | | | |
| **010 12 02 00** | | **General principles** | | | | | | | | |
| (01) | | State the objectives of security. | X | X | X | X | X | | | |
| ~~LO (02)~~ | | ~~Explain where further information in addition to ICAO Annex 17 concerning aviation security is available.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| **010 12 03 00** | | ~~**Organisation**~~ **Intentionally left blank** | | | | | | | | |
| ~~LO (01)~~ | | ~~Understand the required activities expected at each airport serving international civil aviation.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| **010 12 04 00** | | **Preventive security measures** | | | | | | | | |
| (01) | | Describe the objects not allowed (for reasons of aviation security) on board an aircraft engaged in international civil aviation. | X | X | X | X | X | | | |
| ~~LO (02)~~ | | ~~Explain what each Contracting State is supposed to do concerning originating passengers and their cabin baggage prior to boarding an aircraft engaged in international civil aviation operations.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| (03) | | State what each Contracting State is supposed to do if passengers subjected to security control have mixed after a security screening point. | X | X | X | X | X | | | |
| ~~LO (04)~~ | | ~~Explain what has to be done at airports serving international civil aviation to protect cargo, baggage, mail stores and operator supplies against an act of unlawful interference.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (05) | | Explain what has to be done when passengers, who are obliged to travel because of judicial or administrative proceedings, are supposed to board an aircraft. | X | X | X | X | X | | | |
| (06) | | Understand what has to be considered if law enforcement officers carry weapons on board. | X | X | X | X | X | | | |
| ~~LO (07)~~ | | ~~Describe what is meant by 'access control' at an aerodrome.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| **010 12 05 00** | | **Management of response to acts of unlawful interference** | | | | | | | | |
| (01) | | Describe the assistance each Contracting State shall provide to an aircraft subjected to an act of unlawful seizure. | X | X | X | X | X | | | |
| (02) | | State the circumstances which could prevent a Contracting State to detain an aircraft on the ground after being subjected to an act of unlawful seizure. | X | X | X | X | X | | | |
| **010 12 06 00** | | **Operators' security programme** | | | | | | | | |
| (01) | | Understand the principles of the written operator security programme each Contracting State requires from operators. | X | X | X | X | X | | | |
| **010 12 07 00** | | **Security procedures in other documents, i.e. ICAO Annex 2, ICAO Annex 6, ICAO Annex 14, ICAO Doc 4444** | | | | | | | | |
| ***010 12 07 01*** | | ***ICAO Annex 2 — Rules of the Air, Attachment B — Unlawful interference*** | | | | | | | | |
| (01) | | Describe what the PIC should do unless considerations on board the aircraft dictate otherwise. | X | X | X | X | X | | | |
| (02) | | Describe what the PIC should do if:<br>— the aircraft must depart from its assigned track; | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — the aircraft must depart from its assigned cruising level;<br>— the aircraft is unable to notify an ATS unit of the unlawful interference. | | | | | | | | |
| (03) | | Describe what the PIC should attempt to do with regard to broadcast warnings to decide at which level the crew is proceeding if no applicable regional procedures for in-flight contingencies have been established. | X | X | X | X | X | | | |
| ***010 12 07 02*** | | ***ICAO Annex 6 — Operation of Aircraft, Chapter 13 — Security*** | | | | | | | | |
| (01) | | Describe the special considerations referring to flight crew compartment doors with regard to aviation security. | X | X | X | X | X | | | |
| ~~LO (02)~~ | | ~~Explain what an operator shall do to minimise the consequences of acts of unlawful interference.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Too vague |
| ~~LO (03)~~ | | ~~Explain what an operator shall do to have appropriate employees available who can contribute to the prevention of acts of sabotage or other forms of unlawful interference.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ***010 12 07 03*** | | ***ICAO Annex 14 — Aerodromes, Chapter 3 — Physical characteristics*** | | | | | | | | |
| (01) | | Describe what minimum distance an isolated aircraft parking position (after the aircraft has been subjected to unlawful interference) should have from other parking positions, buildings or public areas. | X | X | X | X | X | | | |
| ***010 12 07 04*** | | ***ICAO Doc 4444* — Air Traffic Management** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | Describe the considerations that must take place with regard to a taxi clearance in case an aircraft is known or believed to have been subjected to unlawful interference. | X | X | X | X | X | | | |
| **010 13 00 00** | | **AIRCRAFT ACCIDENT AND INCIDENT INVESTIGATION** | | | | | | | | |
| **010 13 01 00** | | **Essential definitions of ICAO Annex 13** | | | | | | | | |
| (01) | | Define the following terms:<br>accident, aircraft, flight recorder, incident, investigation, maximum mass, operator, serious incident, serious injury, State of Design, State of Manufacture, State of Occurrence, State of the Operator, State of Registry. | X | X | X | X | X | | | |
| (02) | | Define the difference between 'serious incident' and 'accident'. | X | X | X | X | X | | | |
| (03) | | Determine whether a certain occurrence has to be defined as a serious incident or as an accident. | X | X | X | X | X | | | |
| (04) | | Recognise the description of an accident or incident. | X | X | X | X | X | | | |
| ~~**010 13 02 00**~~ | | ~~**Applicability of ICAO Annex 13**~~ | | | | | | | | No practical use |
| ~~LO (01)~~ | | ~~Describe the geographical limits, if any, within which the specifications given in Annex 13 apply.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |
| ~~**010 13 03 00**~~<br>**010 13 02 00** | | ~~**ICAO**~~ **Accident and incident investigation** | | | | | | | | |
| (01) | | State the objective(s) of the investigation of an accident or incident according to ICAO Annex 13. | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (02) | | Understand the general procedures for the investigation of an accident or incident according to ICAO Annex 13 and relevant EU regulations. | X | X | X | X | X | | | |
| ~~**010 13 04 00**~~ **010 13 03 00** | | **Accident and incident investigation in EU regulations** ~~**accordance with EU documents**~~ | | | | | | | | |
| (01) | | Be familiar with ~~Council Directive 94/56/EC of 21 November 1994 establishing the fundamental principles governing the investigation of civil aviation accidents and incidents.~~ Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation. | X | X | X | X | X | | | Reference document has been updated |
| (02) | | Be familiar with ~~Council Directive 2003/42/EC of the European Parliament and of the Council of 13 June 2003 on occurrence reporting in civil aviation.~~ Regulation (EU) No 376/2014 of the European Parliament and of the Council of 3 April 2014 on the reporting, analysis and follow-up of occurrences in civil aviation, amending Regulation (EU) No 996/2010 of the European Parliament and of the Council. | X | X | X | X | X | | | As above |
| ~~LO (03)~~ | | ~~Be familiar with the differences between the procedures for accident and incident investigation in EU regulations compared to ICAO Annex 13.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |
| ~~**010 14 00 00**~~ | | ~~**Regulation (EC) No 216/2008 (the Basic Regulation)**~~ ***Intentionally left blank*** | | | | | | | | No practical use |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ~~**010 14 01 00**~~ | | ~~**Definitions**~~<br>***Intentionally left blank*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Certificate, commercial operation, complex motor powered aircraft, flight simulation training device and rating.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |
| ~~**010 14 02 00**~~ | | ~~**Applicability**~~ ***Intentionally left blank*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the applicability of the Basic Regulation.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |
| **NEW** | | **REGULATION (EU) No 965/2012 ON AIR OPERATIONS** | | | | | | | | New subsection<br>Should be placed after 010 06 00 00 |
| ***New*** | | ***Regulation structure*** | | | | | | | | New paragraph |
| (01) New | | Describe the diferent parts of this Regulation. | X | X | X | X | X | X | X | |
| (02) New | X | State that Regulation (EU) No 965/2012 covers all types of operations. | X | X | X | X | X | X | X | |
| ***New*** | | ***Definitions (Annex I)*** | | | | | | | | New paragraph |
| (01) New | | Recall the definitions in the Regulation not already given in ICAO PAN-OPS. | X | X | X | X | X | X | X | |
| ***New*** | | ***Part-ORO and Part-CAT (Annexes III and IV)*** | | | | | | | | New paragraph |
| (01) New | | Explain the differences between the ICAO PAN-OPS and Regulation (EU) No 965/2012. | X | X | X | X | X | X | X | |
| ***New*** | | ***Parts SPA, NCC and NCO (Annexes V, VI and VII)*** | | | | | | | | New paragraph |
| (01) New | | Describe the structure of these Parts. | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (02) New | X | Explain the main content of these Parts, except the operational procedures. | X | X | X | X | X | | | |

## Overview of the proposed amendments to Subject 031 'Mass and balance'

Learning Objectives (LOs) regarding fundamentals of centre-of-gravity (CG) calculations have been deleted or moved to other LO sections enabling effective construction of the exams through the exam distribution AMC3 to ARA.FCL.300(b). A few low/no relevance LOs have been deleted.

In the text relating to the LOs, some definitions have been updated and outdated terms deleted.

A few LOs have been added to increase understanding and reflect industry advances. This includes LOs requiring understanding and use of aircraft communications addressing and reporting system (ACARS), electronic flight bags (EFBs), and the 'less paper in the cockpit' (LPC) software.

**SUBJECT 031 — MASS AND BALANCE**

*Note that the term 'mass' is used to describe a quantity of matter, and 'weight' when describing the force. However, the term 'weight' is normally used in aviation to colloquially describe mass. The professional pilot should always note the units to determine if the term 'weight' is being used to describe a force (e.g. unit newton) or quantity of matter (e.g. unit kilogram).*

(1) ~~MASS~~ DEFINITIONS OF MASSES AND INDEXES

*Allowed take-off mass*

The mass taking into consideration all possible limitations for take-off including restrictions caused by regulated take-off mass and regulated landing mass.

*Area load or floor load*

The load (or mass) distributed over a defined area. Units of measurement used:

— SI: $N/m^2$, $kg/m^2$;

— Non-SI: psi, $lb/ft^2$.

*Basic empty mass*

The mass of an aircraft plus standard items such as: unusable fuel; full operating fluids; fire extinguishers; emergency oxygen equipment. (The lowest mass that is used in FCL exams.)

*Dry operating mass*

The total mass of an aircraft ready for a specific type of operation excluding all usable fuel and traffic load. This mass includes items such as:

— crew and crew baggage;

— catering and removable passenger service equipment (food, beverages, potable water, lavatory chemicals, etc.);

— special operational equipment (e.g. stretchers, rescue hoist, cargo sling).

*Dry operating index (DOI)*

The index for the position of the centre of gravity at dry operating mass.

*Index*

An index is a means to both reduce figures manipulated by the user, and represent the mass and the location of each item.

*In-flight mass/Gross mass*

The mass of an aircraft in flight at a specified time.

*Landing mass*

The mass of the aircraft at landing.

*Loading index*

A non-dimensional figure that reduces the value of a moment. It is used to simplify mass and balance calculations.

*Maximum structural in-flight mass with external loads (applicable to helicopters only)*

The maximum permissible total mass of the helicopter with external loads.

*Maximum structural landing mass*

The maximum permissible total mass of the aircraft at landing under normal circumstances.

*Maximum structural mass*

The maximum permissible total mass of the aircraft at any time. It will be given only if there is no difference between maximum structural taxi mass,

maximum structural take-off mass and maximum structural landing mass.

*Maximum structural take-off mass*

The maximum permissible total mass of the aircraft at commencement of take-off.

*Maximum (structural) taxi mass or maximum (structural) ramp mass*

The maximum permissible total mass of the aircraft at commencement of taxiing.

*Maximum zero fuel mass*

The maximum permissible mass of an aircraft with no usable fuel.

*Minimum mass (applicable to helicopters only)*

The minimum permissible total mass for specific helicopter operations.

*Operating mass*

The dry operating mass plus take-off fuel but without traffic load.

*Performance-limited landing mass*

The mass subject to the destination airfield limitations. ~~It must never exceed the maximum structural limit.~~

*Performance-limited take-off mass*

The take-off mass subject to departure airfield limitations. ~~It must never exceed the maximum structural limit.~~

*Ramp mass*

*See 'taxiing mass'.*

*Regulated landing mass*

The lower of performance-limited landing mass and maximum structural landing mass.

*Regulated take-off mass*

The lower of performance-limited take-off mass and maximum structural take-off mass.

*Running (or linear) load*

The load (or mass) distributed over a defined length of a cargo compartment irrespective of load width. Units of measurement used:

— SI: N/m, kg/m;

— Non-SI: lb/in, lb/ft.

*Take-off fuel*

The total amount of usable fuel at take-off.

*Take-off mass*

The mass of the aircraft including everything and everyone contained in it at the commencement of take-off.

*Taxi mass or ramp mass*

The mass of the aircraft at the commencement of taxiing.

*Traffic load*

The total mass of passengers, baggage and cargo including any non-revenue load.

*Zero-fuel mass*

The dry operating mass plus traffic load but excluding fuel.

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **030 00 00 00** | | **FLIGHT PERFORMANCE AND PLANNING** | | | | | | | | |
| **031 00 00 00** | | **MASS AND BALANCE — AEROPLANES/HELICOPTERS** | | | | | | | | |
| **031 01 00 00** | | **PURPOSE OF MASS-AND-BALANCE CONSIDERATIONS** | | | | | | | | |
| **031 01 01 00** | | **Mass limitations** | | | | | | | | |
| ***031 01 01 01*** | | ***Importance with regard to structural limitations*** | | | | | | | | |
| (01) | X | Describe the relationship between aircraft mass and structural stress.<br>*Remark: See also 021 01 01 00.* | X | X | X | X | X | | | |
| (02) | X | Describe why ~~that~~ mass must be limited to ensure adequate margins of strength. | X | X | X | X | X | | | Increased understanding |
| ***031 01 01 02*** | | ***Importance with regard to performance***<br>*Remark: See also S~~s~~ubjects 032/034 and 081/082.* | | | | | | | | |
| (01) | | Describe the relationship between aircraft mass and performance. | X | X | X | X | X | | | |
| (02) | X | Describe why ~~that~~ aircraft mass must be limited to ensure adequate aircraft performance. | X | X | X | X | X | | | Increased understanding |
| ~~LO (03)~~ | | ~~Describe that the actual aircraft mass must be known during flight as the basis for performance-related decisions.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | **Too basic** |
| **031 01 02 00** | | **Centre-of-gravity (CG) limitations** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***031 01 02 01*** | | ***Importance with regard to stability and controllability***<br>*Remark: See also Ssubjects 081/082.* | | | | | | | | |
| (01) | X | Describe the relationship between CG position and stability/controllability of the aircraft. | X | X | X | X | X | | | |
| (02) | | Describe the consequences if CG is in front of the forward limit. | X | X | X | X | X | | | |
| (03) | | Describe the consequences if CG is behind the aft limit. | X | X | X | X | X | | | |
| ***031 01 02 02*** | | ***Importance with regard to performance***<br>*Remark: See also Ssubjects 032/034 and 081/082.* | | | | | | | | |
| (01) | X | Describe the relationship between CG position and aircraft performance. | X | X | X | X | X | | | |
| (02) | | Describe the effects of CG position on performance parameters (speeds, altitude, endurance and range). | X | X | X | X | X | | | |
| **031 02 00 00** | | **LOADING** | | | | | | | | |
| **031 02 01 00** | | **Terminology** | | | | | | | | |
| ***031 02 01 01*** | | ***Mass terms*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | X | Define the following mass terms:<br>— basic empty mass;<br>— dry operating mass;<br>— operating mass;<br>— take-off mass;<br>— landing mass;<br>— ramp/taxiing mass;<br>— in-flight mass (gross mass);<br>— zero-fuel mass. | X | X | X | X | X | | | |
| ***031 02 01 02*** | | ***Load terms (including fuel terms)***<br>*Remark: See also Ssubject 033.* | | | | | | | | |
| (01) | X | Define the following load terms:<br>— payload/traffic load;<br>— block fuel;<br>— taxiing fuel;<br>— take-off fuel;<br>— trip fuel;<br>— reserve fuel (contingency, alternate, final reserve and additional fuel);<br>— extra fuel. | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (02) | | Explain the relationship between the various load-and-mass components listed in 031 02 01 01 and 031 02 01 02. | X | X | X | X | X | | | |
| (03) | | Calculate the mass of particular components from other given components. | X | X | X | X | X | | | |
| (04) | | Convert fuel mass, volume and density given in different units used in aviation. | X | X | X | X | X | | | |
| **031 02 02 00** | | **Mass limits** | | | | | | | | |
| ***031 02 02 01*** | | ***Structural limitations*** | | | | | | | | |
| (01) | X | Define the maximum zero-fuel mass. | X | X | | | | | | |
| (02) | X | Define the maximum ramp/taxiing mass. | X | | | | | | | |
| (03) | X | Define the maximum take-off mass. | X | X | X | X | X | | | |
| ~~LO (04)~~ | ~~X~~ | ~~Maximum in-flight (gross) mass~~. | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Comment on NPA 2014-29 (D1) not relevant for CAT |
| (05) | X | Define the maximum in-flight (gross) mass with external load. | | | X | X | X | | | |
| (06) | X | Define the maximum landing mass. | X | X | X | X | X | | | |
| ***031 02 02 02*** | | ***Performance and regulated limitations*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | ~~Define~~ Describe the following performance and regulated mass limitations:<br>— performance-limited take-off mass;<br>— performance-limited landing mass;<br>— regulated take-off mass;<br>— regulated landing mass. | X | X | X | X | X | | | |
| ***031 02 02 03*** | | ***Cargo compartment limitations*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Define the following cargo compartment limitations:~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |
| (02) | X | Define the maximum floor load (maximum load per unit of area). | X | X | X | X | X | | | |
| (03) | X | Define the maximum running load (maximum load per unit of fuselage length). | X | X | X | X | X | | | |
| **031 02 03 00** | | **Mass calculations** | | | | | | | | |
| ***031 02 03 01*** | | ***Maximum masses for take-off and landing*** | | | | | | | | |
| (01) | | Calculate the maximum mass for take-off (regulated take-off mass) given mass-and-load components and structural/ performance limits. | X | X | X | X | X | | | |
| (02) | | Calculate the maximum mass for landing (regulated landing mass) given mass-and-load components and structural/ performance limits. | X | X | X | X | X | | | |
| (03) | | Calculate the allowed mass for take-off. | X | X | X | X | X | | | |
| ***031 02 03 02*** | | ***Allowed traffic load and fuel load*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | Calculate the maximum allowed traffic load and fuel load in order not to exceed the given allowed take-off mass. | X | X | X | X | X | | | |
| (02) | | Calculate 'under load'/'over load' given the allowed mass for take-off, operating mass and actual traffic load. | X | X | X | X | X | | | |
| ***031 02 03 03*** | | ***Use of standard masses for passengers, baggage and crew*** | | | | | | | | |
| (01) | X | Extract the appropriate standard masses for passengers, baggage and crew from relevant documents or operator requirements. | X | X | X | X | X | | | |
| (02) | | Calculate the traffic load by using standard masses. | X | X | X | X | X | | | |
| **031 03 00 00** | | ~~**FUNDAMENTALS OF CENTRE OF GRAVITY CALCULATIONS**~~ **INTENTIONALLY LEFT BLANK** | | | | | | | | |
| ~~**031 03 01 00**~~ | | ~~**Definition of Centre of Gravity (CG)**~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Define and explain the meaning of 'CG'.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Moved to 031 04 01 02 |
| ~~**031 03 02 00**~~ | | ~~**Conditions of equilibrium (balance of forces and balance of moments**~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Define 'datum' (reference point), 'moment arm' and 'moment'.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Moved to 031 04 01 01 |
| ~~LO (02)~~ | | ~~Name the conditions of equilibrium.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |
| ~~**031 03 03 00**~~ | | ~~**Basic calculations of CG**~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Resolve numerical problems using the principle of equilibrium of forces and moments.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | No practical use |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **031 04 00 00** | | **MASS-AND-BALANCE DETAILS OF AIRCRAFT** | | | | | | | | |
| **031 04 01 00** | | **Contents of mass-and-balance documentation** | | | | | | | | |
| ***031 04 01 01*** | | ***Datum, moment arm*** | | | | | | | | |
| (01) | X | State ~~Name~~ where the datum and moment arms for aircraft can be found. | X | X | X | X | X | | | Clarity |
| (02) | X | Extract the appropriate data from given documents. | X | X | X | X | X | | | |
| (03) | X | Define 'datum' (reference point), 'moment arm' and 'moment'. | X | X | X | X | X | | | Moved from 031 03 02 00 (01) |
| ***031 04 01 02*** | | ***CG position as distance from datum*** | | | | | | | | |
| (01) | X | Name where the CG position for an aircraft at basic empty mass can be found. | X | X | X | X | X | | | |
| (02) | X | Name where the CG limits for an aircraft can be found. | X | X | X | X | X | | | |
| ~~LO (03)~~ | | ~~Extract the CG limits from given aircraft documents.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 031 04 01 04 01 |
| (04) | | Describe ~~State~~ the different forms in presenting CG position as distance from datum or other references. | X | X | X | X | X | | | Increased skill level |
| (05) | X | Define and explain the meaning of 'CG'. | X | X | X | X | X | | | Moved from 031 03 01 00 (01) |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***031 04 01 03*** | | ***CG position as percentage of mean aerodynamic chord (% MAC)***<br>*Remark: Knowledge of the definition of MAC is covered under reference 081 01 01 05.* | | | | | | | | |
| (01) | | Determine ~~Extract~~ % MAC information from aircraft documents. | X | X | | | | | | |
| (02) | | Explain the principle of using % MAC for the description of the CG position. | X | X | | | | | | |
| (03) | | Calculate the CG position as % MAC. | X | X | | | | | | |
| ***031 04 01 04*** | | ***Longitudinal CG limits*** | | | | | | | | |
| (01) | | Extract the appropriate data from given sample documents. | X | X | X | X | X | | | |
| ***031 04 01 05*** | | ***Lateral CG limits*** | | | | | | | | |
| (01) | | Extract the appropriate data from given sample documents. | | | X | X | X | | | |
| ***031 04 01 06*** | | ***Details of passenger and cargo compartments*** | | | | | | | | |
| (01) | X | Extract the appropriate data (e.g. seating schemes, compartment dimensions and limitations) from given sample documents. | X | X | X | X | X | ~~X~~ | | |
| ***031 04 01 07*** | | ***Details of fuel system relevant to mass-and-balance considerations*** | | | | | | | | |
| (01) | X | Extract the appropriate data (e.g. fuel-tank capacities and fuel-tank positions) from given sample documents. | X | X | X | X | X | ~~X~~ | | |
| (02) New | | Explain and calculate aircraft CG movement as a flight progresses given appropriate data. | X | | | | | | | Required understanding |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (03) New | | Explain advantages and risks associated with fuel tanks in the aeroplane's fin or horizontal stabiliser. | X | | | | | | | Required to reflect the distribution of fuel between tanks in modern long-haul aeroplanes |
| **031 04 02 00** | | **Determination of aircraft empty mass and CG position by weighing** | | | | | | | | |
| ***031 04 02 01*** | | ***Weighing of aircraft (general aspects)*** | | | | | | | | |
| (01) | | Explain the general procedure and regulations for weighing of an aircraft (conditions, intervals, reasons and requirements for reweighing).<br>*Remark: See the applicable operational requirements.* | X | X | X | X | X | | | |
| (02) | X | Extract and interpret entries from/in 'mass (weight) report' of an aircraft. | X | X | X | X | X | | | |
| ***031 04 02 02*** | | ***Calculation of mass and CG position of an aircraft using weighing data*** | | | | | | | | |
| (01) | | Calculate the mass and CG position of an aircraft from given reaction forces on jacking points. | X | X | X | X | X | | | |
| **031 04 03 00** | | **Extraction of basic empty mass and CG data from aircraft documentation** | | | | | | | | |
| ***031 04 03 01*** | | ***Basic empty mass (BEM) and/or dry operating mass (DOM)*** | | | | | | | | |
| (01) | X | Extract values for BEM and/or DOM from given documents. | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***031 04 03 02*** | | ***CG position and/or moment at BEM/DOM*** | | | | | | | | |
| (01) | X | Extract values for CG position and moment at BEM and/or DOM from given documents. | X | X | X | X | X | | | |
| ***031 04 03 03*** | | ***Deviations from standard configuration*** | | | | | | | | |
| (01) | | Extract values from given documents for deviation from standard configuration as a result of varying crew, optional equipment, optional fuel tanks, etc. | X | X | X | X | X | | | |
| **031 05 00 00** | | **DETERMINATION OF CG POSITION** | | | | | | | | |
| **031 05 01 00** | | **Methods** | | | | | | | | |
| ***031 05 01 01*** | | ***Arithmetic method*** | | | | | | | | |
| (01) | | Calculate the CG position of an aircraft by using the formula:<br>CG position = sum of moments / total mass. | X | X | X | X | X | | | |
| ***031 05 01 02*** | | ***Graphic method*** | | | | | | | | |
| (01) | | Determine the CG position of an aircraft by using the loading graphs given in sample documents. | X | X | X | X | X | | | |
| ***031 05 01 03*** | | ***Index method*** | | | | | | | | |
| (01) | X | Explain the principle of the index method. | X | X | X | X | X | | | |
| (02) | | Explain ~~Define the terms~~ 'index' ~~'loaded index'~~ and ~~'dry operating index'~~ DOI, and calculate the DOI given the relevant formula and data. | X | X | X | X | X | | | Increase in skill level and required addition of DOI calculation |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| 031 05 01 03 03 | | Explain ~~State~~ the advantage(s) of the index method. | X | X | X | X | X | | | |
| **031 05 02 00** | | **Load and trim sheet** | | | | | | | | |
| ***031 05 02 01*** | | ***General considerations*** | | | | | | | | |
| (01) | X | Explain the principle and the purpose of load sheets. | X | X | | | | | | |
| (02) | X | Explain the principle and the purpose of trim sheets. | X | | | | | | | |
| ***031 05 02 02*** | | ***Load sheet and CG envelope for light aeroplanes and for helicopters*** | | | | | | | | |
| (01) | | Add loading data and calculate masses in a sample load sheet. | X | X | X | X | X | | | |
| (02) | | Calculate moments and CG positions. | X | X | X | X | X | | | |
| (03) | | Check CG position at zero-fuel mass and take-off mass to be within the CG envelope including last-minute changes, if applicable. | X | X | X | X | X | | | |
| ***031 05 02 03*** | | ***Load sheet for large aeroplanes*** | | | | | | | | |
| (01) | | ~~Explain the purpose of load-sheet sections and the methods for establishing~~ Complete a sample load sheet to determine the 'allowed mass for take-off', 'allowed traffic load' and 'under load'. | X | | | | | | | |
| (02) | | Explain the purpose of load sheet sections and the methods for assessing load distribution. | X | | | | | | | |
| (03) | | Explain the purpose of load sheet sections and methods for cross-checking the actual and limiting mass values. | X | | | | | | | |
| (04) | | ~~Calculate and/or c~~omplete and cross-check a sample load sheet. | X | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***031 05 02 04*** | | ***Trim sheet for large aeroplanes*** | | | | | | | | |
| (01) | | Explain the purpose of the trim sheet and the methods to determine the CG position. | X | | | | | | | |
| (02) | | Check ~~that~~ if the zero-fuel mass CG and/or index is within the limits. | X | | | | | | | |
| (03) | | Determine the fuel index by using the 'fuel index correction table' and determine the CG position as % MAC. | X | | | | | | | |
| (04) | | Check that the take-off mass CG and/or index are within the limits. | X | | | | | | | |
| (05) | | Determine 'stabiliser trim units' for take-off. | X | | | | | | | |
| (06) | | Explain the difference between certified and operational CG limits. | X | | | | | | | |
| (07) New | | Determine the zero-fuel mass CG and/or index. | X | | | | | | | Required |
| (08) New | | Explain the relationship between nose-up trim units and CG position and the operational significance. | X | | | | | | | Required for understanding particularly as some airlines move from %MAC to just nose-up trim in EFB data |
| ***031 05 02 05*** | | ***Last-minute changes*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | Complete and check a load and trim sheet for last-minute changes. | X | | | | | | | |
| (02) New | | Explain the significance of a last-minute change in terms of required load and trim sheet amendment. | X | | | | | | | Essential knowledge |
| (03) New | | Complete and check a load and trim sheet for post-planning load additions greater than last-minute change. | X | | | | | | | Essential knowledge |
| ***031 05 03 01*** | | ***Repositioning of CG by shifting the load*** | | | | | | | | |
| (01) | | Calculate the mass to be moved over a given distance, or to/from given compartments, to establish a defined CG position. | X | X | X | X | X | | | |
| (02) | | Calculate the distance to move a given mass to establish a defined CG position. | X | X | X | X | X | | | |
| (03) New | X | Describe methods to check the cargo loading order in relation to the loading manifest. | X | X | | | | | | Essential knowledge, particularly for cargo operations |
| (04) New | | Determine if CG remains within limits if cargo has been loaded in incorrect order or loaded in incorrect location. | X | X | | | | | | Essential knowledge |
| ***031 05 03 02*** | | ***Repositioning of CG by additional load or ballast*** | | | | | | | | |
| (01) | | Calculate the amount of additional load or ballast to be loaded at a given position or compartment to establish a defined CG position. | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (02) | | Calculate the loading position or compartment for a given amount of additional load or ballast to establish a defined CG position. | X | X | X | X | X | | | |
| **031 06 00 00** | | **CARGO HANDLING** | | | | | | | | |
| **031 06 01 00** | | **Types of cargo (general aspects)** | | | | | | | | |
| (01) | | ~~Explain~~ Describe the ~~basic idea of~~ typical types of cargo, e.g. containerised cargo, palletised cargo, bulk cargo, and the advantages of containerised and palletised cargo. | X | X | X | X | X | | | Relevance |
| **031 06 02 00** | | **Floor-area load and running-load limitations in cargo compartments** | | | | | | | | |
| (01) | | Calculate the required floor-contact area for a given load to avoid exceeding the maximum permissible floor load of a cargo compartment. | X | X | X | X | X | | | |
| (02) | | Calculate the maximum mass of a container with given floor-contact area to avoid exceeding the maximum permissible floor load of a cargo compartment. | X | X | X | X | X | | | |
| (03) | | Calculate the linear load distribution of a container to avoid exceeding the maximum permissible running load. | X | X | X | X | X | | | |
| **031 06 03 00** | | **Securement of load** | | | | | | | | |
| (01) | | Explain the reasons for restraining or securing cargo and baggage. ~~having an adequate tie-down of loads.~~ | X | X | X | X | X | | | Clarification |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (02) | | ~~Name~~Describe the basic methods for restraining or securing loads. | X | X | X | X | X | | | Increase skill level |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ***New paragraph*** | | ***Other methods to present load and trim information*** | | | | | | | | To reflect industry advances<br>Should be placed before 031 05 03 01 |
| (01) New | | Describe and extract information from other methods of presenting load and balance information, e.g. aircraft communications addressing and reporting system (ACARS), electronic flight bags (EFBs), and the 'less paper in the cockpit' (LPC) software. | X | | | | | | | To reflect industry advances |

## Overview of the proposed amendments to Subject 032 'Performance (aeroplane)'

Subject 032 has been considerably amended for the following purposes:

— to prevent repetition across the sections;

— to facilitate national aviation authorities in conducting effective and consistent examinations through the application of the updated AMC1 ARA.FCL.300(b) 'Examination procedures'; and

— to address the basic requirements underpinning performance by adding new Learning Objectives (LOs); the purpose is to provide the basic concepts on which aeroplane performance is established.

**SUBJECT 032 — PERFORMANCE (AEROPLANE)**

*Note that the term 'mass' is used to describe a quantity of matter, and 'weight' when describing the force. However, the term 'weight' is normally used in aviation to colloquially describe mass. The professional pilot should always note the units to determine if the term 'weight' is being used to describe a force (e.g. unit newton) or quantity of matter (e.g. unit kilogram).*

~~(1)~~ For theoretical knowledge examination purposes:

— 'c~~C~~limb angle' is assumed to be air-mass-related~~.~~;

— 'f~~F~~light-path angle' is assumed to be ground-related~~.~~;

— 's~~S~~creen height for take-off' is the vertical distance between the take-off surface and the take-off flight path at the end of the take-off distance~~.~~;

— 's~~S~~creen height for landing' is the vertical distance between the landing surface and the landing flight path from which the landing distance begins.

~~(2) For mass definitions, please refer to CHAPTER D (SUBJECT 031 — MASS AND BALANCE).~~

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| **030 00 00 00** | | **FLIGHT PERFORMANCE AND PLANNING** | | | | | | | | |
| **032 00 00 00** | | **PERFORMANCE — AEROPLANES** | | | | | | | | |
| **032 01 00 00** | | **GENERAL** | | | | | | | | |
| **032 01 01 00** | | **Performance legislation** | | | | | | | | |
| ***032 01 01 01*** | | ***Applicability of ~~A~~airworthiness requirements according to CS-23 and CS-25*** | | | | | | | | |
| (01) | X | Describe the applicability, basic and categories of ~~Interpret~~ the ~~European Union airworthiness requirements according to~~ aeroplanes operating under CS-23 and CS-25 (CS 23.1, 23.3, 25.1 and 25.20) ~~relating to aeroplane performance.~~ | X | X | | | | | | To split LOs to appropriate section and for clarity<br>Deeper level of this LO is in new 032 02 01 00 and 032 04 01 |
| ~~LO (02)~~ | | ~~Interpret the European Union airworthiness requirements according to CS-25 aeroplanes relating to aeroplane performance.~~ | X | | | | | | | Included in above LO at basic level, and interpretation level of this LO is in new 032 04 01 |
| (03) | X | Describe ~~Name~~ the general differences between aeroplanes as certified according to CS-23 and CS-25. | X | | | | | | | Clarity |
| ***032 01 01 02*** | | ***Operational regulations and safety*** | | | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (01) | X | Describe the basic concept ~~Interpret~~ that the applicable operational requirements differ depending on ~~related to~~ aeroplane performance. | X | X | | | | | | Deeper level of this LO is split between new 032 02, 03 and 04 |
| (02) | | Describe ~~Name and define~~ the performance classes for commercial air transport~~ation~~ according to the applicable operational requirements. | X | X | | | | | | Increased LO skill level to increase understanding |
| ***032 01 01 03*** | | ***Performance and safety*** | | | | | | | | New paragraph |
| (01) New | X | State that aeroplane performance for commercial air transport restricts the weight of a dispatched aeroplane to achieve a sufficient level of safety. | X | X | | | | | | Reasoning underpinning performance |
| (02) New | X | Describe that the minimum level of safety required for commercial air transport is ensured through the combination of airworthiness requirements and operational limitations, i.e. the more stringent airworthiness requirements of CS-25 enable a wider range of operating conditions for these aeroplanes. | X | X | | | | | | Reasoning underpinning performance |
| ***032 01 01 04*** | | ***Performance definitions and safety factors*** | | | | | | | | New paragraph |
| (01) New | X | Describe measured performance and explain how it is determined. | X | X | | | | | | Concepts underpinning performance |
| (02) New | | Describe gross performance. | X | X | | | | | | Concepts underpinning performance |
| (03) New | | Describe net performance and safety factors. | X | X | | | | | | Concepts underpinning performance |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (04) New | X | Describe that the size of a safety factor depends on the likelihood of the event and the range of the measured performance data. | X | X | | | | | | Concepts underpinning performance |
| (05) New | | Describe the relationship between net and gross take-off and landing distances and net and gross climb and descent gradients. | X | X | | | | | | Concepts underpinning performance |
| **032 01 02 00** | | **General performance theory** | | | | | | | | |
| ~~***032 01 02 01***~~ | | ~~***Stages of flight***~~ | | | | | | | | Too low level |
| ~~LO (01)~~ | | ~~Describe the following stages of flight:~~<br>~~— take-off;~~<br>~~— climbing flight;~~<br>~~— level flight;~~<br>~~— descending flight;~~<br>~~— approach and landing.~~ | ~~X~~ | ~~X~~ | | | | | | |
| ***032 01 02 02*** | | ***Definitions and terms ~~and concepts~~*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Define 'steady' flight.~~ | ~~X~~ | ~~X~~ | | | | | | Too low level |
| ~~LO (02)~~ | | ~~Resolve the forces during steady climbing and descending flight.~~ | ~~X~~ | ~~X~~ | | | | | | Split by phase of flight and moved to new 032 01 04 01 and new 032 01 05 01 |
| ~~LO (03)~~ | | ~~Determine the opposing forces during horizontal steady flight.~~ | ~~X~~ | ~~X~~ | | | | | | Too low level |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~LO (04)~~ | | ~~Interpret the 'thrust/power required' and 'thrust/power available' curves.~~ | X | X | | | | | | Moved to 032 01 03 01 (03), 032 01 04 05 and 032 01 05 04<br>Split by phase of flight |
| ~~LO (05)~~ | | ~~Describe the meaning of 'excess thrust and power' using appropriate graphs.~~ | X | X | | | | | | Split and amended<br>In new 032 01 03 01, 032 01 04 04 and 032 01 05 03 |
| ~~LO (06)~~ | | ~~Describe the effect of excess thrust and power on speed and/or climb performance.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to 032 01 03 01 (02), 032 01 04 04, and 032 01 05 03 |
| ~~LO (07)~~ | | ~~Calculate the all engine and one engine out climb gradient from given values of thrust, drag and aeroplane mass.~~ | X | X | | | | | | Moved to new 032 01 04 11 |
| ~~LO (08)~~ | | ~~Explain climb, level flight and descent performance in relation to the combination of thrust/power available and required.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 01 04 03 and new 032 01 05 02 |
| ~~LO (09)~~ | | ~~Describe the difference between a climb angle and gradient.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication<br>In new 032 01 04 06 |
| (10) | X | Define the terms 'climb angle' and 'climb gradient'. | X | X | | | | | | |
| (11) | X | Define the terms 'flight-path angle' and 'flight-path gradient'. | X | X | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (12) | X | Define the terms ‘descent angle’ and ‘descent gradient’. | X | X | | | | | | |
| (13) | X | Explain the difference between climb/descent angle and flight-path angle. | X | X | | | | | | |
| (14) | X | Define ~~‘service’ and~~ ‘absolute ceiling’. | X | X | | | | | | No definition for service ceiling |
| (15) | | Describe the ~~terms~~ ‘clearway’ (CWY)~~’~~ and ‘stopway’ (STW)~~’~~ according to CS-Definitions. | X | X | | | | | | Increased skill level |
| (16) | | Describe ~~Define the terms~~:<br>— t~~T~~ake-o~~O~~ff r~~R~~un a~~A~~vailable (TORA);<br>— t~~T~~ake-o~~O~~ff d~~D~~istance a~~A~~vailable (TODA);<br>— a~~A~~ccelerate-s~~S~~top d~~D~~istance a~~A~~vailable (ASDA)~~.~~;<br>and determine from given data and/or appropriate aerodrome charts. | X | X | | | | | | Increased skill level |
| (17) | | Describe ~~Define~~ ‘screen height’ including ~~and list~~ its various values. | X | X | | | | | | Increased skill level |
| (18) | X | Define the terms ‘range’ and ‘endurance’. | X | X | | | | | | |
| (19) | | Define an aeroplane’s ‘s~~S~~pecific r~~R~~ange’ (SR) in terms of nautical air miles per unit of fuel, and specific range over the ground ($SR_G$) in terms of nautical ground miles per unit of fuel. | X | X | | | | | | Added for clarification |
| ~~LO (20)~~ | | ~~Define an aeroplane’s ‘Specific Fuel Consumption (SFC)~~<br>~~*Remark: Engine specific fuel consumption is covered in 021.*~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 01 03 02 (01) & (02) |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (21) New | | Define power available and power required. | X | X | | | | | | Required knowledge |
| ***032 01 02 03*** | | ***Variables influencing performance*** | | | | | | | | |
| (01) | X | Name the following factors that affect aeroplane performance~~, in~~ particular: pressure altitude and temperature,~~ air density~~, wind, aeroplane weight~~mass~~, aeroplane configuration, aeroplane anti-skid status, aeroplane centre of gravity (CG), aerodrome runway surface, and aerodrome runway slope. | X | X | | | | | | Air density covered in pressure altitude (and temperature) |
| (02) New | X | Describe how, for different altitudes, thrust and power available vary with speed for a propeller-driven aeroplane. | X | X | | | | | | Required basic knowledge |
| (03) New | X | Describe how, for different altitudes, thrust and power available vary with speed for a turbojet aeroplane. | X | | | | | | | Required basic knowledge |
| (04) New | | Describe how, for different altitudes, drag and power required vary with indicated airspeeds (IAS) and true airspeeds (TAS). | X | X | | | | | | Required knowledge |
| (05) New | | Describe how, for different aeroplane weights and configurations, the drag and power required vary with IAS and TAS. | X | X | | | | | | Required knowledge |
| **032 01 03 00** | | **Level flight, range and endurance** | | | | | | | | New subtopic |
| ***032 01 03 01*** | | ***Steady level flight*** | | | | | | | | New paragraph |
| (01) New | X | Explain how drag (thrust required) and power required vary with speed in straight and level flight. | X | X | | | | | | Required basic knowledge |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (02) | X | Explain ~~Describe~~ the effect of excess thrust and power on speed in level flight ~~and/or climb performance~~. | X | X | | | | | | Clarity<br>Split on phase of flight, climb performance in new 032 01 04, increased skill level |
| (03) | | Interpret the 'thrust/power required' and 'thrust/power available' curve in straight and level flight. | X | X | | | | | | Moved from 032 01 02 02 (04) and split by phase of flight |
| (04) New | | Explain how the maximum straight and level flight IAS and TAS vary with altitude. | X | X | | | | | | Required knowledge |
| (05) | | Describe situations in which a pilot may elect to fly for ~~Define the cruise procedures~~ 'maximum endurance' or ~~and~~ 'maximum range'. | X | X | | | | | | Moved from old 032 04 03 01<br>Practical application added |
| ***032 01 03 02*** | | ***Range*** | | | | | | | | New paragraph |
| (01) | | Define a jet aeroplane's s~~S~~pecific f~~F~~uel c~~C~~onsumption (SFC) and describe how it affects fuel flow and specific range. | X | | | | | | | Moved from old 032 01 02 02<br>Practical application added |
| (02) | | Define a propeller-driven aeroplane's ~~Specific Fuel Consumption (~~SFC~~)~~ and describe how it affects fuel flow and specific range. | X | X | | | | | | Moved from old 032 01 02 02 and amended for practical application |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (03) New | | Explain the optimum speed for maximum SR for a jet aeroplane in relation to the drag curve. | X | | | | | | | Required knowledge |
| (04) New | | Explain the optimum speed to achieve maximum SR for a propeller-driven aeroplane in relation to the power required and drag graphs. | X | X | | | | | | Required knowledge |
| (05) | | Explain the effect of aeroplane weight and CG position on fuel consumption, range and the optimum speed for maximum SR. | X | X | | | | | | Moved from 032 03 03 02 and 032 04 03 05 and combined |
| (06) | | State ~~Define aeroplane~~ how a jet engine's ~~Specific Fuel Consumption~~ ~~(~~SFC~~)~~ varies with temperature and revolutions per minute (RPM). | X | | | | | | | Required knowledge |
| (07) New | | Explain how SR for a jet aeroplane varies with altitude and under different meteorological conditions. | X | | | | | | | Moved from 032 04 03 05 (02)/(03) and combined |
| (08) New | | Explain how $SR_G$ for a propeller-driven aeroplane varies with altitude and under different meteorological conditions. | X | X | | | | | | Required to increase understanding |
| (09) | | Explain the effect of weight ~~mass~~ on the optimum altitude for maximum range. | X | X | | | | | | Moved from old 032 03 03 02 |
| (10) New | | Describe the effect of wind on SR and $SR_G$ and the optimum speed the effect on the optimum speed for $SR_G$ compared to the optimum speed for SR. | X | X | | | | | | Required knowledge |
| ***032 01 03 03*** | | ***Maximum endurance*** | | | | | | | | New section |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (01) | | Explain fuel flow in relation to TAS and thrust for a jet aeroplane. | X | | | | | | | Moved from old 032 04 03 02 and split by aeroplane type |
| (02) | | State ~~Find~~ the speed for maximum endurance for a jet aeroplane. | X | | | | | | | Moved from old 032 04 03 02 and split by aeroplane type and for clarity |
| (03) | | Explain fuel flow in relation to TAS and thrust for a propeller-driven aeroplane. | X | X | | | | | | Moved from old 032 04 03 02 and split by aeroplane type |
| (04) | | State ~~Find~~ the speed for maximum endurance for a propeller-driven aeroplane and the disadvantages of holding at this speed (e.g. high angle of attack (AoA) and lack of speed stability). | X | X | | | | | | Moved from old 032 04 03 02 and split by aeroplane type and for clarity |
| (05) | | Explain the effect of wind and altitude on endurance and the maximum endurance speed for a turbojet aeroplane. | X | | | | | | | Moved from old 032 02 04 00, 032 04 03 05 (02) and (03) where it was duplicated<br>Split between this LO and following LO on aeroplane type |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (06) | | Explain the effect of wind and altitude on endurance and the maximum endurance speed for a propeller-driven aeroplane. | X | X | | | | | | Moved from old 032 02 04 00, 032 04 03 05 (02) and (03) where it was duplicated<br>Split between this LO and above on aeroplane type |
| (07) New | | Describe the effect of holding straight and level compared to holding in a race-track pattern and the operational situations when it could be used (elected by pilot or air traffic control (ATC), when delays at arrival airport are in place). | X | X | | | | | | Required knowledge |
| ***032 01 04 00*** | | ***Climbing*** | | | | | | | | New section |
| (01) | | Resolve the forces during a steady climb~~ing and descending flight~~. | X | X | | | | | | Moved from old 032 01 02 02 and split by phase of flight |
| (02) | | Define and explain the following terms:<br>— critical engine;<br>— speed for best angle of climb ($V_X$);<br>— speed for best rate of climb ($V_Y$). | X | X | | | | | | Moved from old 032 03 01 |
| (03) | | Explain climb~~, level flight and descent~~ performance in relation to the ~~combination of~~ thrust~~/power~~ available and thrust required (angle of climb) and power available and power required (rate of climb). | X | X | | | | | | Moved from old 032 01 02 08 and split |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (04) | | Explain ~~Describe~~ the meaning and effect of 'excess thrust' and 'excess power' in a steady climb. | X | X | | | | | | Moved from old 032 02 01 01 and split by phase of flight, and increased skill level |
| (05) | | Interpret the 'thrust/power required' and 'thrust/power available' curves in a steady climb. | X | X | | | | | | Moved from old 032 01 02 02 (04) and split by phase of flight |
| (06) | | Explain ~~Describe~~ the difference between a climb angle and gradient. | X | X | | | | | | Moved from old 032 01 02 02 and increased skill level |
| (07) | | Explain the effect of weight ~~mass~~ on the climb angle and rate of climb and the speed for best angle and best rate of climb. | X | X | | | | | | Moved from old 032 03 02 02 and amended for clarity |
| (08) | | Explain the effects of temperature~~, wind~~ pressure altitude, including an inversion on climb performance (angle and rate of climb). | X | X | | | | | | Moved from 032 02 02 00 and split Statement on inversion moved from 050 09 06 01 |
| (09) New | | Explain the effect of configuration on climb performance (angle and rate of climb and $V_X$ and $V_Y$). | X | X | | | | | | Required knowledge |
| (10) | | Describe the effect of engine failure on take-off climb performance (angle and rate of climb and $V_X$ and $V_Y$). | X | X | | | | | | Moved from 032 03 02 01 together with elements from 032 03 01 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (11) | | Calculate the all-engine- and one-engine-out climb gradient from given values of engine thrust and aeroplane drag and ~~aeroplane~~ weight~~mass~~. | X | X | | | | | | Moved from 032 01 02 02 |
| ***032 01 05 00*** | | ***Descending*** | | | | | | | | New section |
| (01) | | Resolve the forces during steady ~~climbing and~~ descent~~ding flight~~ and in the glide. | X | X | | | | | | Moved from 032 01 02 02 (02) and split |
| (02) | | Explain ~~climb, level flight and~~ descent performance in relation to ~~the combination of~~ thrust~~/power~~ available and thrust required (drag), and power available and power required. | X | X | | | | | | Moved from 032 01 02 08 and amended for clarity |
| (03) | | Explain ~~Describe~~ the meaning and effect of 'excess thrust required' (drag) and 'excess power required' in a steady descent. | X | X | | | | | | Moved from 032 02 01 01 (05) and 032 02 01 01 (06) |
| (04) | | Interpret the 'thrust/power required' and 'thrust/power available' curves in a steady descent. | X | X | | | | | | Moved from 032 01 02 02 04 and split by phase of flight |
| (05) | | Explain the effect of mass, altitude, wind, speed and configuration on the glide descent. | X | X | | | | | | Moved from 032 02 02 00 (01) |
| (06) | | Explain the effect of mass, altitude, wind, speed and configuration on the powered descent. | X | X | | | | | | Moved from 032 02 02 00 (01) |
| **032 02 00 00** | | **CS-23/OPS PERFORMANCE CLASS B — THEORY ~~SINGLE-ENGINE AEROPLANES~~** | | | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| **032 02 01 00** | | **Airworthiness requirements and definitions ~~of speeds used~~** | | | | | | | | |
| (01) | X | Define the following to speeds ~~according CS-23~~:<br>— stall speeds $V_S$, $V_{S0}$ and $V_{S1}$;<br>— rotation speed $V_R$;<br>— speed at 50 ft above the take-off surface level;<br>— reference landing speed $V_{REF}$. | X | X | | | | | | To prevent requirement to duplicate LOs in 032 04 for CS-25 aeroplanes using any or some of these speeds |
| (02) New | | Describe the limitations on $V_R$, the speed at 50 ft above the take-off surface and $V_{REF}$, and given the appropriate stall speed estimate the values based on these limitations for a single-engine, class B aeroplane. | X | X | | | | | | Required understanding |
| (03) New | | Describe the limitations on VR, the speed at 50 ft above the take-off surface and $V_{REF}$, and given the appropriate stall speed estimate the values based on these limitations for a multi-engine, class B aeroplane. | X | X | | | | | | Required understanding |
| (04) | | Describe ~~Interpret~~ the European Union airworthiness requirements according to CS-23 relating to aeroplane performance (CS-23 SUBPART A — GENERAL, PERFORMANCE, CS-23.45 to 23.78 inclusive). | X | X | | | | | | Moved from old 032 01 01 and duplicated in old LOs 032 02 03 00, 032 03 03 01 and 032 03 03 03 |
| (05) | | Define and identify the critical engine of a multi-engine propeller aeroplane. | X | X | | | | | | Moved from old 032 03 01 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (06) | | Explain the effect of the critical engine inoperative on the power required, ~~and~~ the total drag (thrust required) and climb performance. | X | X | | | | | | Moved from old 032 03 01 |
| (07) | | Explain the effect of engine failure on the controllability of a multi-engine aeroplane under given conditions. | X | X | | | | | | Moved from old 032 03 01 |
| ~~**032 02 02 00**~~ | | ~~**Effect of variables on single-engine aeroplane performance**~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the effect of the wind component on take-off and landing performance.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 02 03 |
| ~~LO (02)~~ | | ~~Determine the regulatory factors for take-off and landing according to the applicable operational requirements.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 03 |
| ~~LO (03)~~ | | ~~Explain the effects of temperature, wind and altitude on climb performance.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 01 04 |
| ~~LO (04)~~ | | ~~Explain the effects of altitude and temperature on cruise performance~~. | ~~X~~ | ~~X~~ | | | | | | Duplication included in new 032 01 03 |
| ~~LO (05)~~ | | ~~Explain the effects of mass, wind, and speed on descent performance.~~ | X | X | | | | | | Moved to new 032 01 05 |
| **032 02 03 00** | | **Take-off and landing** | | | | | | | | |
| ~~LO (01)~~ | | ~~Interpret the take-off and landing requirements according to EUOPS~~ | X | X | | | | | | In 032 02 01 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (02) | X | Define the following distances and masses:<br>— take-off distance;<br>— landing distance;<br>— ground-roll distance;<br>— maximum allowed take-off mass;<br>— maximum allowed landing mass. | X | X | | | | | | Clarity |
| (03) | | Explain the effect of flap-setting on the take-off and landing ground-roll distance. | X | X | | | | | | Combined with 032 03 02 01 |
| (04) | | Explain the effects of the following runway (RWY) variables on take-off distances:<br>— RWY slope;<br>— RWY surface conditions: dry, wet and contaminated;<br>— RWY elevation. | X | X | | | | | | Moved from old 032 04 01<br>It includes content duplicated in two LOs previously in old 032 03 02 01 |
| (05) | | For both fixed and constant speed propeller aeroplanes, explain the effect of airspeed on thrust during the take-off run. | X | X | | | | | | Moved from old 032 03 02 01 |
| (06) | | Describe ~~Explain~~ the effect of brake release before take-off power is set on the TODA and ASDA. | X | X | | | | | | Moved from old 032 03 02 01 |
| (07) New | | Explain the effect of wind on take-off and landing distance and determine the actual head/tailwind component given runway direction and wind speed and direction. | X | X | | | | | | Required knowledge |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (08) New | | Explain why an aeroplane has maximum crosswind limit(s) and determine the crosswind component given runway direction and wind speed and direction. | X | X | | | | | | Required knowledge |
| (09) | | Explain the percentage of accountability for headwind and tailwind components during take-off and landing calculations. | X | X | | | | | | Moved from old 032 03 02 01 |
| (10) | | Explain the effect of runway conditions on the landing distance. | X | X | | | | | | Moved from old 032 03 02 03 |
| (11) | | Explain the effects of pressure altitude and temperature on the take-off distance. | X | X | | | | | | Moved from old 032 04 01 01 |
| (12) New | | Describe the landing airborne and ground roll and estimate the effect on landing distance of the aeroplane being too fast or too high at the screen. | X | X | | | | | | Required knowledge |
| (13) New | | Describe the net take-off flight path (NTOFP) for a multi-engine, class B aeroplane. | X | X | | | | | | Required knowledge |
| (14) New | | Describe the dimensions of the NTOFP accountability area (domain). | X | X | | | | | | Required knowledge |
| **032 02 04 00** | | **Climb, cruise and descent** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the effects of the different recommended power settings on range and endurance.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication in 033 |
| ~~LO (02)~~ | | ~~Explain the effects of wind and altitude on maximum endurance speed.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to 032 01 03 03 |
| (03) | | Describe the climb and en-route requirements according to the applicable operational requirements. | X | X | | | | | | Moved and split from 032 01 01 01 (01) |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (04) New | | For a single-engine aeroplane, calculate expected obstacle clearance (in visual meteorological conditions (VMC) given gross climb performance, obstacle height and distance from reference zero. | X | X | | | | | | Required for threat and error management (TEM) (Multi-engine aeroplane NTOFP in 032 03) |
| (05) New | | For a single-engine aeroplane, calculate the net glide gradient and net glide distance, given aeroplane altitude and terrain elevation, gross gradient or lift/drag ratio (L/D ratio), and headwind or tailwind component. | X | X | | | | | | Required for understanding and TEM |
| ~~**032 02 05 00**~~ | | ~~**Use of aeroplane performance data**~~ | | | | | | | | Moved to 032 03 to avoid duplication |
| ~~***032 02 05 01***~~ | | ~~***Take-off***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Find the minimum or maximum wind component.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 03 03 01 |
| ~~LO (02)~~ | | ~~Find the take-off distance and ground-roll distance.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 03 03 01 |
| ~~LO (03)~~ | | ~~Find the take-off speed.~~ | ~~X~~ | ~~X~~ | | | | | | Moved into new 032 03 03 01 |
| ~~***032 02 05 02***~~ | | ~~***Climb***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Find the maximum rate-of-climb speed.~~ | ~~X~~ | ~~X~~ | | | | | | Not required as it is a given speed |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~LO (02)~~ | | ~~Find the time, distance and fuel to climb.~~ | ~~X~~ | ~~X~~ | | | | | | Covered in old 033 01 01 01 (03), 033 01 01 01 (04), 033 01 01 05 (03), 033 02 01 07 (03) and 033 03 02 02 (02) |
| ~~LO (03)~~ | | ~~Find the rate of climb.~~ | ~~X~~ | ~~X~~ | | | | | | Move to 032 03 |
| ~~***032 02 05 03***~~ | | ~~***Cruise***~~ | | | | | | | | Duplication in 033 01 01 05 05, 033 02 01 07 05, 033 03 01 00 02, 033 03 01 00 03, 033 03 01 00 04 |
| ~~LO (01)~~ | | ~~Find power settings, cruise true airspeed (TAS) and fuel consumption.~~ | ~~X~~ | ~~X~~ | | | | | | |
| ~~LO (02)~~ | | ~~Find range and endurance.~~ | ~~X~~ | ~~X~~ | | | | | | |
| ***032 02 05 04*** | | ***Landing*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Find the and/or minimum or maximum wind component.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 03 |
| ~~LO (02)~~ | | ~~Find the landing distance and ground roll distance.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication in 032 03 04 |
| **032 03 00 00** | | **CS-23/EU-OPS PERFORMANCE CLASS B — USE OF AEROPLANE PERFORMANCE DATA FOR SINGLE- AND MULTI-ENGINE AEROPLANES** | | | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~**032 03 01 00**~~ | | ~~**Definitions of terms and speeds**~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Define and explain the following terms:~~<br>~~— critical engine;~~<br>~~— speed for best angle of climb ($V_x$);~~<br>~~— speed for best rate of climb ($V_y$).~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 01 04 and 032 02 01 04 |
| ~~LO (02)~~ | | ~~Explain the effect of the critical engine inoperative on the power required and the total drag.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 02 01 04 |
| ~~LO (03)~~ | | ~~Explain the effect of engine failure on controllability under given conditions.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 02 01 04 |
| ~~**032 03 02 00**~~ | | ~~**Effect of variables on multi-engine aeroplane performance**~~ | | | | | | | | |
| ~~***032 03 02 01***~~ | | ~~***Take-off and landing***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the effect of flap setting on the ground roll distance.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication in 032 02 03 00 |
| ~~LO (02)~~ | | ~~For both fixed and constant speed propellers, explain the effect of airspeed on thrust during the take-off run.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 02 03 00 |
| ~~LO (03)~~ | | ~~Explain the effect of pressure altitude on performance limited take-off mass.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 02 03 00 |
| ~~LO (04)~~ | | ~~Explain the effect of runway conditions on the take-off distance.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 02 03 00 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~LO (05)~~ | | ~~Determine the regulation factors for take-off according to the applicable operational requirements.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication<br>Included in new 032 03 03 01 |
| ~~LO (06)~~ | | ~~Explain the percentage of accountability for headwind and tailwind components during take-off and landing calculations.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 02 03 00 |
| ~~LO (07)~~ | | ~~Interpret obstacle clearance at take-off.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication |
| ~~LO (08)~~ | | ~~Explain the effect of selected power settings, flap settings and aeroplane mass on the rate of climb.~~ | X | X | | | | | | Moved to new 032 01 04 and split |
| ~~LO (09)~~ | | ~~Describe the effect of engine failure on take-off climb performance.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 01 04 |
| ~~LO (10)~~ | | ~~Explain the effect of brake release before take-off power is set on the take-off and accelerate-stop distance.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 02 03 00 |
| ~~***032 03 02 02***~~ | | ~~***Climb, cruise and descent***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the effect of CG on fuel consumption.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 01 03 02 |
| ~~LO (02)~~ | | ~~Explain the effect of mass on the speed for best angle and best rate of climb.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 01 04 |
| ~~LO (03)~~ | | ~~Explain the effect of temperature and altitude on fuel flow.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication |
| ~~LO (04)~~ | | ~~Explain the effect of wind on the maximum range speed and speed for maximum climb angle.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 01 03 and 032 01 04 |
| ~~LO (05)~~ | | ~~Explain the effect of mass, altitude, wind, speed and configuration on glide descent.~~ | X | X | | | | | | Moved to new 032 01 05 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~LO (06)~~ | | ~~Describe the various cruise techniques.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication in new 032 01 03 |
| ~~LO (07)~~ | | ~~Describe the effect of loss of engine power on climb and cruise performance.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication in new 032 01 04 & 05 |
| ~~***032 03 02 03***~~ | | ~~***Landing***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the effect of runway conditions on the landing distance.~~ | ~~X~~ | ~~X~~ | | | | | | Moved to new 032 02 05 00 |
| ~~LO (02)~~ | | ~~Determine the regulatory factors for landing according to the applicable operational requirements.~~ | X | X | | | | | | Duplication in new 032 03 |
| ~~**032 03 03 00**~~ | | ~~**Use of aeroplane performance data**~~ | | | | | | | | |
| ***032 03 03 01*** | | ***Take-off*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Find take-off field length data.~~ | ~~X~~ | ~~X~~ | | | | | | |
| (02) | | Calculate the field-length-limited take-off mass and take-off speeds, given de-factored distance, configuration, pressure altitude, temperature and headwind/tailwind component. | X | X | | | | | | Amended to include old 032 02 05 01 and 032 03 03 01 |
| (03) | | Determine ~~Find~~ the accelerate-go distance and ~~as well the~~ accelerate-stop distance data. | X | X | | | | | | Clarification |
| (04) | | Determine ~~Find~~ the ground-roll and take-off distance from graphs. | X | X | | | | | | Clarification |
| ~~LO (05)~~ | | ~~Calculate the maximum effort take-off data.~~ | ~~X~~ | ~~X~~ | | | | | | Included in new 032 03 03 01 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (06) | | Determine ~~Calculate~~ all-engine- and critical-engine-out take-off climb data. | X | X | | | | | | Clarification |
| (07) | | Determine ~~Calculate~~ NTOFP ~~obstacle clearance take-off climb data~~ for a MEP aeroplane of given mass and given airfield conditions, and calculate obstacle clearance based on the NTOFP. | X | X | | | | | | Clarification |
| (08) | | Determine ~~Find~~ the minimum headwind or maximum tailwind ~~wind~~ component. | X | X | | | | | | Moved from old 032 02 05 01 |
| (09) New | | Given take-off run available (TORA), TODA and ASDA, slope and surface conditions, calculate the de-factored distance to be used for commercial air transport in gross, level, paved take-off graphs. | X | X | | | | | | Required<br>Application of new 032 02 03 00 |
| (10) New | | Calculate the minimum TORA or TODA for commercial air transport given the de-factored take-off distance or run, runway surface and slope. | X | X | | | | | | Required and application of new 032 02 03 00 |
| ***032 03 03 02*** | | ***Climb*** | | | | | | | | |
| (01) | | Determine ~~Find~~ rate of climb ~~and climb gradient~~. | X | X | | | | | | LO split with 032 03 03 02 and clarified |
| ~~LO (02)~~ | | ~~Calculate single engine service ceiling.~~ | ~~X~~ | ~~X~~ | | | | | | Service ceiling not defined |
| (03) | | Calculate obstacle clearance climb data. | X | X | | | | | | |
| (04) New | | Determine the still-air and flight-path gradient for given IAS, altitude, temperature, aeroplane weight and, if relevant, wind component. | X | X | | | | | | Required knowledge |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~***032 03 03 03***~~ | | ~~***Cruise and descent***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Find power settings, cruise true airspeed (TAS) and fuel consumption.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication in 033 |
| ~~LO (02)~~ | | ~~Calculate range and endurance data.~~ | ~~X~~ | ~~X~~ | | | | | | Duplication in 033 |
| **032 03 03 04** | | **Landing** | | | | | | | | |
| (03) | | ~~Find landing field length data.~~ Determine the maximum landing mass and/or minimum or maximum wind component. | X | X | | | | | | Clarification |
| (04) | | Determine ~~Find~~ landing climb data in the event of balked landing. | X | X | | | | | | Clarification |
| (05) | | Determine ~~Find~~ landing distance and ground-roll distance for given flap position, aeroplane weight and airfield data. | X | X | | | | | | Clarification and includes below LO |
| ~~LO (06)~~ | | ~~Find short field landing distance and ground roll distance.~~ | ~~X~~ | ~~X~~ | | | | | | In above LO |
| (07) New | | Calculate given landing distance available (LDA), slope and surface, the de-factored distance to be used for commercial air transport in gross, level, paved landing graphs. | X | X | | | | | | Required and application of new 032 02 03 00 |
| (08) New | | Calculate the minimum landing distance (LD) that must be available for commercial air transport given the de-factored landing distance, runway surface and slope. | X | X | | | | | | Required and application of new 032 02 03 00 |
| **032 04 00 00** | | **CS-25/EU-OPS PERFORMANCE CLASS A — THEORY** | | | | | | | | |
| **032 04 01 00** | | **Take-off** | | | | | | | | |
| (01) | X | Explain the ~~essential~~ forces affecting the aeroplane during the take-off run. | X | | | | | | | Clarification |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (02) | X | State the effects of thrust-to-weight ratio and flap-setting on ground roll. | X | | | | | | | |
| (03) New | | Describe the European Union airworthiness requirements according to CS-25 relating to aeroplane performance general aeroplane and take-off (SUBPART B — FLIGHT PERFORMANCE: CS 25.101 to 25.109 inclusive, and 25.113). | X | | | | | | | From old 032 01 01 01 |
| ***032 04 01 01*** | | ***Definitions of and relationships between ~~of~~ terms ~~used~~*** | | | | | | | | |
| (01) | | Describe ~~Define~~ the terms 'a~~A~~ircraft c~~C~~lassification n~~N~~umber' (ACN)~~'~~ and 'p~~P~~avement c~~C~~lassification n~~N~~umber' (PCN)~~'~~, and the requirements and hazards of operating on aerodrome surfaces with PCNs less than an ACN. | X | | | | | | | Application and TEM |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (02) | | Define and explain the following speeds in accordance with CS-25 or CS-Definitions:<br>— reference stall speed ($V_{SR}$);<br>~~— reference stall speed in the landing configuration ($V_{SR0}$);~~<br>— reference stall speed in a specific configuration ($V_{SR1}$);<br>— 1-g stall speed at which the aeroplane can develop a lift force (normal to the flight path) equal to its weight ($V_{S1g}$);<br>— minimum control speed with critical engine inoperative ($V_{MC}$);<br>— minimum control speed on or near the ground ($V_{MCG}$);<br>— minimum control speed at take-off climb ($V_{MCA}$);<br>— engine failure speed ($V_{EF}$);<br>— take-off decision speed ($V_1$);<br>— rotation speed ($V_R$);<br>— minimum take-off safety speed ($V_{2MIN}$);<br>— minimum unstick speed ($V_{MU}$);<br>— lift-off speed ($V_{LOF}$);<br>— maximum brake energy speed ($V_{MBE}$);<br>— maximum tyre speed ($V_{Max\ Tyre}$)~~;~~.<br>~~— reference landing speed ($V_{REF}$);~~<br>~~— minimum control speed, approach and landing ($V_{MCL}$).~~ | X | | | | | | | Landing definition LOs moved to 032 04 02 04 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (03) | | Explain the interdependence between the above-mentioned speeds where relevant ~~if there is any~~. | X | | | | | | | Clarification |
| (04) | | Define the following distances in accordance with CS-25:<br>— take-off run with all engines operating and one-engine-inoperative;<br>— take-off distance with all engines operating and one-engine-inoperative;<br>— accelerate-stop distance with all engines operating and one-engine-inoperative. | X | | | | | | | |
| (05) New | | Explain how loss of runway length due to alignment is accounted for. | X | | | | | | | Required knowledge |
| ~~LO (06)~~ | | ~~Define the term 'Aeroplane Specific Fuel Consumption (ASFC)'.~~<br>~~*Remark: Engine-specific fuel consumption is covered in subject 021.*~~ | ~~X~~ | | | | | | | Duplication in new 032 01 03 |
| (07) New | | Explain the effect of the interdependency of relevant speeds in 032 04 01 01 02 and the situations in which these independencies can cause speed and performance restrictions. | X | | | | | | | Application and TEM |
| ***032 04 01 02*** | | ***Take-off distances*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the effects of the following runway (RWY) variables on take-off distances:~~<br>~~— RWY slope;~~<br>~~— RWY surface conditions: dry, wet and contaminated;~~<br>~~— RWY elevation.~~ | ~~X~~ | | | | | | | Moved to new 032 02 03 00 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (02) | | Explain the effects of the following aeroplane variables on take-off distances:<br>— aeroplane mass;<br>— take-off configuration;<br>— bleed-air configurations. | X | | | | | | | |
| ~~LO (03)~~ | | ~~Explain the effects of the following meteorological variables on take-off distances:~~<br>~~— wind;~~<br>~~— temperature;~~<br>~~— pressure altitude.~~ | ~~X~~ | | | | | | | Moved to new 032 02 03 00 and split |
| (04) | | Explain the consequence ~~influence~~ of errors in rotation technique on take-off distance:<br>— early and late rotation;<br>— too high and too low rotation angle;<br>— too high and too low rotation rate. | X | | | | | | | |
| (05) | | Explain the take-off distances for specified conditions and configuration for all engines operating and one-engine-inoperative. | X | | | | | | | |
| (06) | | Explain the effect of using clearway on the ~~take-off distance required~~ field-length-limited take-off mass. | X | | | | | | | Clarification |
| (07) | | Explain the influence of aeroplane mass, dense air and flap settings on $V_1$ and $V_{2MIN}$ and thereby take-off distance. | X | | | | | | | Clarification |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~LO (08)~~ | | ~~Explain the time interval allowed for between engine failure and recognition when assessing the TOD.~~ | ~~X~~ | | | | | | | Duplication<br>In new 032 04 |
| (09) | | Explain the effect of an error in ~~miscalculation of~~ $V_1$ on the resulting one-engine-out take-off distance ~~required~~. | X | | | | | | | Clarification |
| ***032 04 01 03*** | | ***Accelerate-stop distance*** | | | | | | | | |
| (01) | | Explain the accelerate-stop distance for specified conditions and configuration for all engines operating and one-engine-inoperative. | X | | | | | | | |
| (02) | | Explain the effect of using a stopway on the ~~accelerate-stop distance required~~ field-length-limited take-off mass. | X | | | | | | | Clarification |
| (03) | | Explain the effect of an error in ~~miscalculation of~~ $V_1$ on the resulting accelerate-stop distance ~~required~~. | X | | | | | | | Clarification |
| (04) | | Explain the effect of runway slope and/or wind component on the accelerate-stop distance. | X | | | | | | | |
| (05) | | Explain how the ~~additional time allowance for~~ accelerate-stop distance is determined ~~allowance determination~~ and discuss the deceleration procedure. | X | | | | | | | |
| (06) | | Explain the use of brakes, anti-skid, use of reverse thrust, ground spoilers or lift dumpers, brake energy absorption limits, delayed temperature rise and brake temperature indication ~~and tyre limitations~~. | X | | | | | | | |
| (07) New | | Explain the hazards of rejecting a take-off from high ground speed and/or high take-off mass, and how to manage these hazards. | X | | | | | | | TEM and application |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ***032 04 01 04*** | | ***Balanced field length concept*** | | | | | | | | |
| (01) | X | Define the term 'balanced field length'. | X | | | | | | | |
| (02) | | Describe ~~Understand~~ the relationship between take-off distance and accelerate-stop distance and identify on a diagram the balanced field length and balanced $V_1$ ~~when using a balanced field~~. | X | | | | | | | |
| (03) | X | Describe the applicability of a balanced field length. | X | | | | | | | |
| ***032 04 01 05*** | | ***Unbalanced field length concept*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Define the term 'unbalanced field length'.~~ | ~~X~~ | | | | | | | |
| (02) | X | Describe the applicability of an unbalanced field length. | X | | | | | | | |
| (03) | | Explain the effect of ~~a~~ additional stopway on the allowed take-off mass and appropriate $V_1$ when using an unbalanced field. | X | | | | | | | Clarity |
| (04) | | Explain the effect of ~~a~~ additional clearway on the allowed take-off mass and appropriate $V_1$ when using an unbalanced field. | X | | | | | | | Clarity |
| ***032 04 01 06*** | | ***Field ~~Runway~~ length ~~l~~Limited ~~t~~Take-o~~O~~ff m~~M~~ass (F~~R~~LTOM)*** | | | | | | | | |
| (01) | | ~~Define~~ Explain the factors that affect the ~~runway length limited take-off mass~~FLLTOM~~for balanced and unbalanced field length~~; | X | | | | | | | Increased skill level |
| (02) New | | Explain the concept of a 'range of $V_1$' and explain reasons for the placement of the designated $V_1$ towards the faster or slower end of the range. | X | | | | | | | Application |

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|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ***032 04 01 07*** | | ***Contaminated runways*** | | | | | | | | **New section**<br>From 071 02 13 00 |
| (01) | | Define a 'contaminated runway', a 'damp runway', a 'wet runway', and a 'dry runway'. | X | X | | | | | | Was 071 02 13 01 |
| (02) | | Describe ~~List~~ the different types of contamination: damp, wet or water patches, rime or frost-covered, dry snow, wet snow, slush, ice, compacted or rolled snow, frozen ruts or ridges. (ICAO Annex 15, Appendix 2) | X | X | | | | | | Was old 071 02 13 04 |
| (03) | X | Identify the difference between friction coefficient and estimated surface friction. (ICAO Annex 15, Appendix 2) | X | X | | | | | | Was old 071 02 13 04 |
| (04) | | State that when friction coefficient is 0.40 or higher, the expected braking action is good. (ICAO Annex 15, Appendix 2) | X | X | | | | | | Was old 071 02 13 04 |
| (05) | | Define the different types of hydroplaning.<br>(NASA TM-85652/Tire friction performance/pp. 6 to 9) | X | X | | | | | | Was old 071 02 13 04 |
| (06) | | Calculate ~~Compute~~ the two dynamic hydroplaning speeds using the following formulas:<br>Spin-down speed (rotating tire) (kt) = 9 square root (pressure in PSI).<br>Spin-up speed (non-rotating tire) (kt) = 7.7 square root (pressure in PSI).<br>(NASA TM-85652/Tire friction performance /p. 8) | X | X | | | | | | Was old 071 02 13 04 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (07) | | State that it is the spin-up speed rather than the spin-down speed which represents the actual tire situation for aircraft touchdown on flooded runways.<br>(NASA TM-85652/Tire friction performance/p. 8) | ~~X~~ | ~~X~~ | | | | | | Was old 071 02 13 04 |
| (08) | | State that some wind limitations may apply in case of contaminated runways. Those limitations are to be found in Part B of the Operations Manual — Limitations. | ~~X~~ | ~~X~~ | | | | | | Was old 071 02 13 04 |
| (09) | | State that the procedures associated with take-off and landing on contaminated runways are to be found in Part B of the Operations Manual — Normal procedures. | ~~X~~ | ~~X~~ | | | | | | Was old 071 02 13 04 |
| (10) | | State that the performance~~s~~ associated with contaminated runways is~~are~~ to be found in Part B of the Operations Manual — Performance. | ~~X~~ | ~~X~~ | | | | | | Was old 071 02 13 04 |
| ***032 04 01 07*** | | ***Take-off climb*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Define the segments of the actual take-off flight path.~~ | ~~X~~ | | | | | | | Moved to new 032 04 01 08 |
| (02) | | Explain the difference between the flat-rated and non-flat-rated part in performance charts. | X | | | | | | | Was old 032 04 01 07 |
| ~~LO (03)~~ | | ~~Determine the changes in the configuration, power, thrust and speed in the take-off flight-path segments.~~ | ~~X~~ | | | | | | | Moved to new 032 04 01 08 |
| (04) | | State ~~Determine~~ the differences in climb-gradient requirements for two-, three- and four-engine aeroplanes. | X | | | | | | | Was old 032 04 01 07 |

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|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~LO (05)~~ | | ~~State the maximum bank angle when flying at $V_2$.~~ | ~~X~~ | | | | | | | Moved to new 032 04 01 08 |
| (06) | | Explain the effects of aeroplane and meteorological conditions on the take-off climb. | X | | | | | | | Was old 032 04 01 07 |
| ~~LO (07)~~ | | ~~Describe the influence of airspeed selection, acceleration and turns on the climb gradients, best rate-of-climb speed and best angle-of-climb speed.~~ | ~~X~~ | | | | | | | Moved to new 032 04 01 08 |
| (08) | | Determine the climb-limited take-off mass. | X | | | | | | | Was old 032 04 01 07 |
| ***032 04 01 08*** | | ***Obstacle-limited take-off*** | | | | | | | | |
| (01) | | Describe the operational regulations for obstacle clearance in the ~~net take-off flight path~~NTOFP. | X | | | | | | | |
| (02) | | Define actual and NTOFP~~net take-off flight path~~ with one-engine-inoperative in accordance with CS-25. | X | | | | | | | |
| (03) | | Explain ~~Determine~~ the effects of aeroplane and meteorological conditions on the ~~determination of~~ obstacle-limited take-off mass. | X | | | | | | | Clarification |
| ~~LO (04)~~ | | ~~Determine the obstacle-limited take-off mass~~ | X | | | | | | | Moved to new 032 05 02 06 |
| (05) | | Describe ~~Define~~ the segments of the actual take-off flight path. | X | | | | | | | Moved from old 032 04 01 07 |
| (06) | | Describe ~~Determine~~ the changes in the configuration, power, thrust and speed in the NTOFP ~~flight path~~ climb segments. | X | | | | | | | Moved from old 032 04 01 07 |

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|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (07) | | State the standard maximum bank angle(s) in the first and second segment, ~~when flying~~ ~~at $V_2$~~, and determine the effect on the stall speed and implication on $V_2$. | X | | | | | | | Moved from old 032 04 01 07 and application |
| (08) | | Explain ~~Describe~~ the influence of airspeed selection, acceleration and turns on the climb gradient~~s, best rate-of-climb speed and best angle-of-climb speed~~. | X | | | | | | | From old 032 04 01 07, increased skill and split |
| (09) | | Describe the European Union airworthiness requirements according to CS-25 relating to aeroplane performance take-off climb and flight path (SUBPART B — FLIGHT PERFORMANCE: CS 25.111, CS 25.115, CS 25.117 and CS 25.121) | X | | | | | | | Split and moved from 032 01 01 01 for clarity and relevance |
| ***032 04 01 09*** | | ***Performance-limited take-off mass (PLTOM), regulated take-off weight (RTOW) tables and EFB*** | | | | | | | | |
| (01) | | Define PLTOM~~performance-limited take-off mass~~ and maximum allowed take-off mass (MATOM). | X | | | | | | | To update LOs |
| (02) | X | Describe RTOW tables and an EFB. | X | | | | | | | To update LOs |
| (03) New | | Interpret what take-off limitation (field length, obstacle, climb, structural, etc.) is restricting a particular MATOM as it is presented using RTOW tables and an EFB. | X | | | | | | | To update LOs |
| (04) New | X | Describe why data from an EFB could differ to data derived from RTOW tables. | X | | | | | | | To update LOs |
| ***032 04 01 10*** | | ***Take-off performance on wet and contaminated runways*** | | | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (01) | | Explain the differences between the take-off performance determination on a wet or contaminated runway and on a dry runway. | X | | | | | | | |
| (02) New | | Describe a wet $V_1$, explain the consequences of using a wet $V_1$ and restrictions on use. | X | | | | | | | Application |
| (03) New | | Describe the hazards, effects and management of operating from a contaminated runway. | X | | | | | | | TEM |
| (04) New | | Describe impingement drag and methods to monitor acceleration. | X | | | | | | | TEM |
| (05) New | | Explain the benefits and implications of using a derating on a contaminated runway. | X | | | | | | | Application and TEM |
| ***032 04 01 11*** | | ***Use of reduced (flexible or flex) and derated thrust*** | | | | | | | | Alternate terminology for same principle added |
| (01) | | Explain the advantages and disadvantages of using reduced (flex) and derated thrust. | X | | | | | | | |
| (02) | | Explain the difference between and principles behind reduced (flex) and derated thrust. | X | | | | | | | |
| (03) | | Explain when reduced (flex) and derated thrust may and may not be used. | X | | | | | | | |
| (04) | | Explain the effect of using reduced (flex) and derated thrust on take-off performance including take-off speeds, take-off distance, climb performance and obstacle clearance. | X | | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (05) | | Explain the assumed temperature method for determining reduced (flex) thrust performance. | X | | | | | | | |
| ***032 04 01 12*** | | ***Take-off performance using different take-off flap settings*** | | | | | | | | |
| (01) | | Explain the advantages and disadvantages of using different take-off flap settings to optimise the performance-limited take-off mass. | X | | | | | | | |
| (02) New | | Determine the optimum flap position and PLTOM from given figures. | X | | | | | | | |
| ***032 04 01 13*** | | ***Take-off performance using increased $V_2$ speeds ('improved climb performance')*** | | | | | | | | |
| (01) | | Explain the advantages and disadvantages of the ~~using~~ increased $V_2$ ~~speeds~~ procedure. | X | | | | | | | |
| (02) | | Explain under what circumstances this procedure can be used. | X | | | | | | | |
| (03) New | | Explain the hazards of the fast $V_1$ and $V_{LOF}$ speeds associated with the increased $V_2$ procedure and how they can be managed. | X | | | | | | | TEM and application |
| ***032 04 01 14*** | | ***Brake-energy and tyre-speed limit*** | | | | | | | | |
| (01) | | Explain the effects on take-off performance of brake-energy and tyre-speed limits. | X | | | | | | | |
| (02) | | Explain under what ~~which~~ conditions ~~this~~ they are more likely to become~~s~~ limiting. | X | | | | | | | |
| ~~***032 04 01 15***~~ | | ~~***Use of aeroplane flight data***~~ | | | | | | | | Moved to 032 05 and split into performance take-off limitation |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~LO (01)~~ | | ~~Determine the maximum masses that satisfy all the regulations for take-off from the aeroplane performance data sheets.~~ | ~~X~~ | | | | | | | Moved to 032 05 and split by phases of flight |
| ~~LO (02)~~ | | ~~Determine the relevant speeds for specified conditions and configuration from the aeroplane performance data sheets.~~ | ~~X~~ | | | | | | | Moved to 032 05 and split by phases of flight |
| **032 04 02 00** | | **Climb** | | | | | | | | |
| ***032 04 02 01*** | | ***Climb techniques*** | | | | | | | | |
| (01) | | Explain the effect of climbing with constant IAS. | X | | | | | | | |
| (02) | | Explain the effect of climbing with constant Mach number. | X | | | | | | | |
| (03) | | Explain the correct sequence of climb speeds for jet transport aeroplanes. | X | | | | | | | |
| (04) | | Determine the effect on TAS when climbing in and above the troposphere at constant Mach number. Explain the term 'cross over altitude' which occurs during the climb speed schedule (IAS–Mach number). x | X | | | | | | | |
| ***032 04 02 02*** | | ***Influence of variables on climb performance*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the effect of aeroplane mass on the rate of climb (ROC).~~ | X | | | | | | | Moved to 032 01 04 and amended |
| ~~LO (02)~~ | | ~~Explain the effect of meteorological variables on ROC.~~ | X | | | | | | | Moved to 032 01 04 and amended |
| (03) | | Explain the effect of aeroplane acceleration during a climb with constant IAS or Mach number. | X | | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (04) | | Explain the effect on the operational speed limit when climbing at constant IAS. | X | | | | | | | |
| (05) | | Explain the term 'crossover altitude' which occurs during the climb speed schedule (IAS–Mach number). | X | | | | | | | Moved from old 032 04 02 03 |
| ~~***032 04 02 03***~~ | | ~~***Use of aeroplane flight data***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the term 'cross over altitude' which occurs during the climb speed schedule (IAS–Mach number).~~ | ~~X~~ | | | | | | | Move to 032 04 02 02 |
| ~~LO (02)~~ | | ~~Calculate the time to climb.~~ | ~~X~~ | | | | | | | In 033 |
| **032 04 03 00** | | **Cruise** | | | | | | | | |
| ~~***032 04 03 01***~~ | | ~~***Cruise techniques***~~ | | | | | | | | Moved to new 032 01 03 |
| ~~LO (01)~~ | | ~~Define the cruise procedures 'maximum endurance' and 'maximum range'.~~ | X | | | | | | | Moved to new 032 01 03 01 04 |
| ~~***032 04 03 02***~~ | | ~~***Maximum endurance***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain fuel flow in relation to TAS and thrust.~~ | ~~X~~ | | | | | | | Moved to new 032 01 03 |
| ~~LO (02)~~ | | ~~Find the speed for maximum endurance.~~ | ~~X~~ | | | | | | | Moved to new 032 01 03 |
| ~~***032 04 03 03***~~ | | ~~***Maximum range***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Define the term 'maximum range'.~~ | ~~X~~ | | | | | | | Moved to new 032 01 01 |
| ***032 04 03 04*** | | ***Long-range cruise*** | | | | | | | | |
| (01) | | Define the term 'long-range cruise'. | X | | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (02) | | Explain differences between flying at the speed for long range and maximum range with regard to fuel-flow and speed stability. | X | | | | | | | |
| ~~***032 04 03 05***~~ | | ~~***Influence of variables on cruise performance***~~ | | | | | | | | Moved to new 032 01 03 |
| ~~LO (01)~~ | | ~~Explain the effect and CG position and actual mass of aircraft on range and endurance.~~ | ~~X~~ | | | | | | | Moved to new 032 01 03 02 |
| ~~LO (02)~~ | | ~~Explain the effect of altitude on range and endurance.~~ | ~~X~~ | | | | | | | Moved to new 032 01 03 02 |
| ~~LO (03)~~ | | ~~Explain the effect of meteorological variables on range and endurance.~~ | ~~X~~ | | | | | | | Moved to new 032 01 03 02 |
| ***032 04 03 06*** | | ***Cruise altitudes*** | | | | | | | | |
| (01) | X | Define the term 'optimum altitude'. | X | | | | | | | |
| (02) | | Explain the factors that~~which~~ affect the ~~choice of~~ optimum altitude. | ~~X~~ | | | | | | | |
| (03) | | Explain the factors that can ~~which might~~ affect or limit the maximum operating altitude. | X | | | | | | | Clarification |
| (04) | | Explain the purpose of, and operational reasons for, a step climb and when a climb would be initiated for optimum range. ~~Explain the advantages and restriction necessity for step climbs~~ | X | | | | | | | Application |
| (05) | | Describe the buffet onset boundary (BOB) and determine the high- and low-speed buffet (speed/Mach number only). high and low-speed buffet (speed/Mach number only).. | X | | | | | | | Section added from 032 04 03 08 (01) |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (06) | | Analyse the influence of bank angle, mass and the 1.3G buffet on a step climb. | X | | | | | | | |
| (07) New | | Describe that the high-speed buffet can occur at speeds slower or faster than $M_{MO}$ high- and low-speed buffet (speed/Mach number only). | X | | | | | | | Required knowledge |
| (08) New | | Explain the reasons why a step climb may not be used (e.g. for short sectors, advantageous winds, avoiding turbulence and due to traffic restrictions). | X | | | | | | | Application |
| ***032 04 03 07*** | | ***Cost ~~i~~Index (CI)*** | | | | | | | | |
| (01) | | Describe ~~the Define the~~ ~~term~~ 'cost index'. | X | | | | | | | Increased skill level |
| (02) | | Describe ~~Understand~~ the reason for economical cruise speed. | X | | | | | | | Clarity |
| (03) New | | Describe the effect of CI on climb and cruise speeds. | X | | | | | | | Updating LOs |
| ~~***032 04 03 08***~~ | | ~~***Use of aeroplane flight data***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Determine the all-engines operating power settings and speeds from the aeroplane performance data sheets for:~~<br>~~— maximum range;~~<br>~~— maximum endurance;~~<br>~~— high-speed and normal cruise;~~<br>~~— high and low-speed buffet (speed/Mach number only).~~ | X | | | | | | | Deleted lines duplicated in 033<br>High and low speed buffet (speed/Mach number only) deleted line moved to new 032 04 03 06 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~LO (02)~~ | | ~~Determine the selection of cruise technique considering cost indexing and passenger requirements against company requirements.~~ | X | | | | | | | Not relevant<br>Company selected |
| ~~LO (03)~~ | | ~~Determine the fuel consumption from the aeroplane performance data sheets for various cruise configurations, holding, approach and transit to an alternate in normal conditions and after an engine failure.~~ | ~~X~~ | | | | | | | Covered in 033 |
| **032 04 04 00** | | **En-route one-engine-inoperative** | | | | | | | | |
| ***032 04 04 01*** | | ***Drift down*** | | | | | | | | |
| (01) | | Describe the determination of en-route flight-path data with one-engine-inoperative in accordance with CS 25.123. | X | | | | | | | |
| (02) | | Describe ~~Determine~~ the minimum obstacle-clearance height prescribed in the applicable operational requirements. | X | | | | | | | Change in skill level, determine in 032 05 |
| (03) | | Describe ~~Define~~ the optimum speed that the pilot should select during drift down. | X | | | | | | | Clarification |
| (04) | | Explain the influence of deceleration on the drift-down profiles. | X | | | | | | | |
| ***032 04 04 02*** | | ***Influence of variables on the en-route one-engine-inoperative performance*** | | | | | | | | |
| (01) | | Describe and explain ~~Identify~~ the factors which affect the en-route net drift-down flight path. | X | | | | | | | Clarification |
| ~~**032 04 04 03**~~ | | ~~***Use of aeroplane flight data***~~ | | | | | | | | Moved to new 032 05 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~LO (01)~~ | | ~~Find one engine out and given highest obstacle and data the heaviest mass that service ceiling, range and endurance from given engine inoperative charts.~~ | ~~X~~ | | | | | | | NPA comment clarification and moved to new 032 05 |
| ~~LO (02)~~ | | ~~Determine the one-engine out net drift~~ | ~~X~~ | | | | | | | Moved to new 032 05 |
| ~~LO (03)~~ | | ~~Find the maximum continuous power/thrust settings from given engine inoperative charts.~~ | ~~X~~ | | | | | | | In 033 |
| **032 04 05 00** | | **Descent** | | | | | | | | |
| ***032 04 05 01*** | | ***Descent techniques*** | | | | | | | | |
| (01) | | Explain the effect of descending at constant Mach number. | X | | | | | | | |
| (02) | | Explain the effect of descending at constant IAS. | X | | | | | | | |
| (03) | | Explain the correct sequence of descent speeds for jet transport aeroplanes. | X | | | | | | | |
| (04) | | Determine the effect on TAS when descending in and above the troposphere at constant Mach number. | X | | | | | | | |
| (05) | | Describe the following limiting speeds for descent:<br>— maximum operating speed ($V_{MO}$);<br>— maximum Mach number ($M_{MO}$). | X | | | | | | | |
| (06) | | Explain the effect of a descent at constant Mach number on the margin to low- and high-speed buffet. | X | | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ***032 04 05 02*** | | ***~~Influence of variables on descent performance~~Energy management in the descent*** | | | | | | | | From upset prevention and recovery training (UPRT) |
| ~~LO (01)~~ | | ~~Explain the influence of mass, configuration and altitude on rate of descent and glide angle.~~ | ~~X~~ | | | | | | | Moved to new 032 01 05 |
| (02) New | | Explain the advantages and principle of a continuous descent. | X | | | | | | | Required knowledge |
| (03) New | X | Describe energy management in terms of chemical, potential and kinetic energy. | X | | | | | | | Required knowledge |
| (04) New | | Describe the effect of increasing/decreasing headwind and tailwind on profile management. | X | | | | | | | Required knowledge |
| (05) New | | Describe the effect of the Mach number to IAS transition (speed conversion) on profile management. | X | | | | | | | Required knowledge |
| (06) New | | Describe situations during the descent and approach in which a pilot could find an aeroplane high and/or fast, and explain how the pilot can manage descent angle/excess energy. | X | | | | | | | Required knowledge |
| ***~~032 04 05 03~~*** | | ***~~Use of aeroplane flight data~~*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Determine the following information for all-engines operating and one engine inoperative from the aeroplane performance data sheets:~~<br>~~— descent rates;~~<br>~~— time and distance for descent;~~<br>~~— fuel used during descent.~~ | X | | | | | | | In 033 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| **032 04 06 00** | | **Approach and landing** | | | | | | | | |
| ***032 04 06 01*** | | ***Approach requirements*** | | | | | | | | |
| (01) | | Describe the CS-25 requirements for the approach climb (CS 25.121). | X | | | | | | | Clarity |
| (02) | | Describe the CS-25 requirements for the landing climb. | X | | | | | | | |
| (03) | | Explain the effect of temperature and pressure altitude on approach and landing-climb performance. | X | | | | | | | |
| ***032 04 06 02*** | | ***Landing-field-length and landing-speed requirements*** | | | | | | | | |
| (01) | X | Describe the landing distance determined according to CS 25.125 ('demonstrated' landing distance). | X | | | | | | | |
| (02) | | Describe ~~Recall~~ the landing-field-length requirements for dry, wet and contaminated runways and the applicable operational requirements. | X | | | | | | | Increased skill level |
| (03) | X | Define the '~~L~~Landing d~~D~~istance a~~A~~vailable' (LDA)~~'~~. | X | | | | | | | |
| (04) | | Define and explain the following speeds in accordance with CS-25 or CS-Definitions:<br>— reference stall speed in the landing configuration ($V_{SR0}$);<br>— reference landing speed ($V_{REF}$);<br>— minimum control speed, approach and landing ($V_{MCL}$). | X | | | | | | | Moved from old 032 04 01 01 |
| ***032 04 06 03*** | | ***Influence of variables on landing performance*** | | | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (01) | | Explain the effect of runway slope, surface conditions and wind on the maximum landing mass for a given runway length in accordance with the applicable operational requirements. | X | | | | | | | |
| (02) | | Explain the effect on landing distance and maximum allowable landing mass of the following devices affecting:<br>— deceleration;<br>— reverse;<br>— anti-skid;<br>— ground spoilers or lift dumpers;<br>— autobrakes. | X | | | | | | | |
| (03) | | Explain the effect of temperature and pressure altitude on the maximum landing mass for a given runway length. | X | | | | | | | |
| (04) | | Explain the effect of hydroplaning on landing distance required and methods of managing landing on contaminated runways. | X | | | | | | | Application |
| ***032 04 06 04*** | | ***Quick turnaround limit*** | | | | | | | | |
| 032 04 06 04 01 | | Define the 'quick turnaround limits' and explain their purpose. | X | | | | | | | |
| ~~***032 04 06 05***~~ | | ~~***Use of aeroplane flight data***~~ | | | | | | | | Moved to new 032 05 |
| ~~LO (01)~~ | | ~~Determine the field length required for landing with a given landing mass from the aeroplane performance data sheets in accordance with the applicable operational requirements.~~ | ~~X~~ | | | | | | | |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| ~~LO (02)~~ | | ~~Determine the landing and approach climb limited landing mass from the aeroplane performance data sheets.~~ | ~~X~~ | | | | | | | |
| ~~LO (03)~~ | | ~~Determine the landing field length limited landing mass from the aeroplane performance data sheets.~~ | ~~X~~ | | | | | | | |
| ~~LO (04)~~ | | ~~Find the structural limited landing mass from the aeroplane performance data sheets.~~ | ~~X~~ | | | | | | | |
| ~~LO (05)~~ | | ~~Calculate the maximum allowable landing mass as the lowest of:~~<br>~~— approach climb and landing climb limited landing mass;~~<br>~~— landing field length limited landing mass;~~<br>~~— structural limited landing mass.~~ | ~~X~~ | | | | | | | |
| ~~LO (06)~~ | | ~~Determine the maximum quick turnaround mass and time under given conditions from the aeroplane performance data sheets.~~ | ~~X~~ | | | | | | | |
| ~~LO (07)~~ | | ~~Determine the limiting landing mass in respect of PCN.~~ | ~~X~~ | | | | | | | |
| **032 05 00 00** | | **CS-25/EU-OPS PERFORMANCE CLASS A — USE OF AEROPLANE PERFORMANCE DATA** | X | | | | | | | New topic |
| **032 05 01 00** | | **Take-off** | | | | | | | | New subtopic |
| (01) New | | Determine from given graphs the FLTOM and describe situations in which this limitation could be most restrictive for take-off. | X | | | | | | | Application and TEM |
| (02) | | Determine from given graphs the climb-limited take-off mass and describe situations in which this limitation could be most restrictive for take-off. | X | | | | | | | From old 032 04 01 07 and application and TEM |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (03) | | Determine from given graphs the obstacle-limited mass and describe situations in which this limitation could be most restrictive for take-off. | X | | | | | | | From old 032 04 01 08 and application and TEM |
| (04) New | | Determine from given graphs the tyre-limited take-off mass. | X | | | | | | | Required knowledge |
| (05) New | | Determine from given graphs the maximum brake-energy-limited take-off mass. | X | | | | | | | Required knowledge |
| (06) New | | Determine the take-off V speeds for the actual take-off mass. | X | | | | | | | Application |
| (07) New | | Determine the maximum take-off mass and the corresponding speeds using given RTOW tables. | X | | | | | | | Updating LOs |
| (08) New | | Using RTOW tables determine the take-off V speeds for the actual take-off weight using appropriate corrections. | X | | | | | | | Updating LOs |
| (09) New | | Determine the assumed temperature from the field-length-limited, climb-limited and obstacle-limited take-off graphs and engine-limiting temperatures tables. | X | | | | | | | Updating LOs |
| (10) New | | Determine the assumed/flex temperature and take-off V speeds using the RTOW tables. | X | | | | | | | Updating LOs |
| ***032 05 02 00*** | | ***Drift down and stabilising altitude*** | | | | | | | | |
| (01) | | Determine the ~~Find~~ one-engine-out ~~service~~ net stabilising altitude (level-off altitude) from given graphs/tables ~~service ceiling, range and endurance from given engine inoperative charts~~. | X | | | | | | | From old 032 04 04 03 |

| Syllabus | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL/IR | ATPL | CPL | | | |
| (02) New | | Determine the maximum mass at which the net stabilising altitude with one-engine-out clears the highest relevant obstacle by the required clearance margin. | X | | | | | | | Required knowledge |
| (03) New | | Determine, using drift-down graphs, fuel used, time and distance travelled in a descent from cruise flight level to a given altitude. | X | | | | | | | From old 032 04 04 03 |
| ***032 05 03 00*** | | ***Landing*** | | | | | | | | |
| (01) | | Determine the field length required for landing with a given landing mass from the aeroplane performance data sheets in accordance with the applicable operational requirements. | X | | | | | | | From old 032 04 06 05 |
| (02) | | Determine the landing and approach climb-limited landing mass from the aeroplane performance data sheets. | X | | | | | | | From old 032 04 06 05 |
| (03) | | Calculate the maximum allowable landing mass as the lowest of:<br>— approach-climb- and landing-climb-limited landing mass;<br>— landing-field-length-limited landing mass;<br>— structural-limited landing mass. | X | | | | | | | From old 032 04 06 05 |
| (04) | | Determine the rejected take-off (RTO), landing ~~maximum quick turnaround~~ ~~mass~~ energy and brake cooling time under given conditions from the aeroplane performance data sheets. | X | | | | | | | From old 032 04 06 |
| (05) | | Determine the maximum 'quick turnaround mass' and deduce if a 'quick turnaround' is possible. | X | | | | | | | From old 032 05 03 00 |

## Overview of the proposed amendments to Subject 033 'Flight planning and monitoring'

Several Learning Objectives (LOs) have been moved from 061 and incorporated into 033 as they refer specifically to the planning of a flight rather than to general navigation knowledge.

Several LOs have been moved from 061 and incorporated into 033 as they refer specifically to in-flight monitoring rather than to general navigation knowledge.

Several new LOs have been introduced in Section 033 02 01 03 to ensure that future commercial pilots are aware of terrain separation criteria.

The performance-based navigation (PBN) terminology for instrument approach procedures (IAPs) is introduced in Section 033 02 01 05.

A new Section 'Selection of alternates' is moved from 071 as this is a planning topic.

**General Student Pilot Route Manual (GSPRM)**

The current Jeppesen Student Pilot Route Manual is very much outdated and as such, it is intended that a new document be introduced to replace it.

This document will be referred to as the General Student Pilot Route Manual (GSPRM) and should contain as a minimum:

1. a table of contents;
2. introduction with the visual flight rules (VFR) and instrument flight rules (IFR) charts' legends;
3. 1:500,000 VFR aeronautical charts of Germany;
4. en-route low- and high-altitude IFR charts to cover the airspace above all EU Member States plus Norway, Switzerland and the Balkans;
5. en-route high-altitude chart of the North Pole (a polar stereographic projection) to illustrate current polar routes;
6. a plotting chart of the North Atlantic (with information on extended range operations with two-engined aeroplanes (ETOPS));
7. area, aerodrome/heliport, aerodrome ground movement, standard instrument departure (SID), standard instrument arrival (STAR), instrument approach charts (IACs) and visual approach charts (VACs) for London Heathrow, Amsterdam Schiphol, Paris Charles de Gaulle, Frankfurt, Stuttgart, Madrid and Munich for aeroplane operations, and Aberdeen, De Kooy and Manston for helicopter operations;
8. an example of a completed ATS flight plan (with instructions on how to complete it), including the ICAO model flight plan form.

The charts should have a frozen date (e.g. 01.01.2017), and be reissued on a regular basis (e.g. every 2 years).

The charts listed above will form the basis for the questions in licensing examinations.

There will be no obligation for any student or approved training organisation (ATO) to buy, use or issue this manual (nor will it have any other subject matter material in it), but the content will be the basis for charts which may appear in Part-FCL exams. Any chart provider (Lido, Jepp, Navtech, etc.) may provide this route manual, but the students will not be expected to learn non-ICAO standard symbology or chart requirements.

**SUBJECT 033 — FLIGHT PLANNING AND MONITORING**

~~(1) For mass definitions, please refer to Chapter D.~~

*Note that the term 'mass' is used to describe a quantity of matter, and 'weight' when describing the force. However, the term 'weight' is normally used in aviation to colloquially describe mass. The professional pilot should always note the units to determine if the term 'weight' is being used to describe a force (e.g. unit newton) or quantity of matter (e.g. unit kilogram).*

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **033 00 00 00** | | **FLIGHT PLANNING AND MONITORING** | | | | | | | | |
| **033 01 00 00** | | **FLIGHT PLANNING FOR VFR FLIGHTS**<br>*Remark: Using training route manual VFR charts or the European Central Question Bank (ECQB) annexes.* | | | | | | | | |
| **033 01 01 00** | | **VFR navigation plan** | | | | | | | | |
| ***033 01 01 01*** | | ***~~Routes, airfields, heights and altitudes from VFR charts~~***<br>***Airspace, communication, visual and radio navigation data from VFR charts*** | | | | | | | | Data available directly from charts have been grouped together<br>Levels for cruise flight moved to 033 01 01 02 |
| (01) | | Select routes ~~and altitudes~~ taking the following criteria into account:<br>— classification of airspace;<br>~~— controlled airspace;~~ | X | X | X | X | X | | | Cruising levels in 033 01 01 02<br>Visual and radio navigation entries clarified |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ~~— uncontrolled airspace;~~<br>— restricted areas;<br>~~— minimum safe altitude;~~<br>~~— VFR semicircular rules;~~<br>— visually conspicuous points;<br>— radio navigation aids. | | | | | | | | |
| ~~LO (02)~~ | | ~~Calculate the minimum pressure or true altitude from minimum grid-area altitude using OAT and QNH.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Moved to 033 01 01 02 (08) |
| ~~LO (03)~~ | | ~~Calculate the vertical and/or horizontal distance and time to climb to a given level or altitude.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Moved to 033 01 01 02 (10) |
| ~~LO (04)~~ | | ~~Calculate the vertical and/or horizontal distance and time to descend from a given level or altitude.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Moved to 033 01 01 02 (10) |
| (05) | | Find the frequency and/or identifiers of radio navigation aids from charts. | X | X | X | X | X | | | Moved from old 033 01 01 04 (02) |
| (06) | | Find the communication frequencies and call signs for the following:<br>— control agencies and service facilities;<br>— f~~F~~light i~~I~~nformation s~~S~~ervices (FIS);<br>— weather information stations;<br>— a~~A~~utomatic t~~T~~erminal i~~I~~nformation s~~S~~ervice (ATIS). | X | X | X | X | X | | | Moved from old 033 01 01 04 (01) |
| ***033 01 01 02*** | | ***Planning ~~C~~courses, distances and cruising levels ~~from~~ with*** | | | | | | | | Cruising levels from old |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ***VFR charts*** | | | | | | | | 033 01 01 01 |
| (01) | | Choose visual waypoints in accordance with specified criteria (large, unique, contrast, vertical extent, etc.). | X | X | X | X | X | | | Clarification of criteria |
| (02) | | Measure courses and distances from a VFR chart. ~~Calculate, or obtain from the chart, courses and distances.~~ | X | X | X | X | X | | | Reworded for clearer requirement |
| (03) | | Find the highest obstacle within a given distance on either side of the course. | X | X | X | X | X | | | |
| (04) | | Find the following data from ~~the~~ a VFR chart and transfer them to ~~the~~ a navigation plan:<br>— waypoints and/or turning points;<br>— distances;<br>— true/magnetic courses. | X | X | X | X | X | | | There is no standard navigation plan |
| (05) | | Describe how to prepare and align a map/chart for use in visual navigation. | X | X | X | X | X | | | Moved from old 061 05 01 00 (07) |
| (06) | | State the function of contour lines on a topographical chart. | X | X | X | X | X | | | Moved from old 061 05 01 00 (11) |
| (07) | | Indicate the role of 'layer tinting' (colour gradient) in relation to the depiction of topography on a chart. | X | X | X | X | X | | | Moved from old 061 05 01 00 (12) |
| (08) | | Using the contours shown on a chart, describe the appearance of a significant feature. | X | X | X | X | X | | | Moved from old 061 05 01 00 (13) |
| (09) | | Calculate the minimum pressure altitude with a given | X | X | X | X | X | | | Moved from old |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | obstacle clearance or true altitude from a given altitude or pressure altitude from minimum grid-area altitude using outside air temperature (OAT) and QNH. | | | | | | | | 033 01 01 01 (02) |
| (10) | | Calculate the vertical and/or horizontal distance and time to climb or descend to/from a given level or altitude with given data. | X | X | X | X | X | | | Moved from old 033 01 01 01 (03), (04) and 033 01 01 05 (03)<br>All three old LOs combined into a single one |
| ***033 01 01 03*** | | ***Aerodrome charts and aerodrome directory*** | | | | | | | | |
| (01) | X | Explain the reasons for studying the visual departure procedures and the available approach procedures. | X | X | X | X | X | | | |
| (02) | | Find all visual procedures which can be expected at the departure, destination and alternate airfields. | X | X | X | X | X | | | |
| (03) | | Find all relevant aeronautical and regulatory information required for VFR flight planning ~~the following data~~ from the charts or directory~~:~~.<br>~~— aerodrome regulations and opening hours;~~<br>~~— terrain high points and man-made structures;~~<br>~~— altitudes;~~<br>~~— courses and radials;~~<br>~~— helipads (for helicopters only);~~ | X | X | X | X | X | | | The list is worthless if it is followed by 'any other relevant information' |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ~~— any other relevant information.~~ | | | | | | | | |
| ~~***033 01 01 04***~~ | | ~~***Communications and radio-navigation planning data***~~ | | | | | | | | |
| ~~LO (01)~~ | | ~~Find the communication frequencies and call signs for the following:~~<br>~~— control agencies and service facilities;~~<br>~~— Flight Information Services (FIS);~~<br>~~— weather information stations;~~<br>~~— Automatic Terminal Information Service (ATIS).~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Moved to 033 01 01 01 (06) |
| ~~LO (02)~~ | | ~~Find the frequency and/or identifier of the appropriate radio-navigation aids.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Moved to 033 01 01 01 (05) |
| ***033 01 01 05*** | | ***Completion of navigation plan*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Complete the navigation plan with the courses and distances as taken from charts.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 01 01 02 (04) |
| ~~LO (02)~~ | | ~~Find the departure and arrival routes.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 01 01 03 (02) |
| ~~LO (03)~~ | | ~~Determine the position of Top of Climb (TOC) and Top of Descend (TOD) from given appropriate data~~. | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 01 01 02 (10) |
| ~~LO (04)~~ | | ~~Determine variation and calculate magnetic courses.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 01 01 02 (04) |
| (05) | | Calculate the t~~T~~rue a~~A~~irspeed (TAS) from given aircraft performance data, altitude and ~~Outside-Air Temperature~~ | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ~~(~~OAT~~)~~. | | | | | | | | |
| (06) | | Calculate w~~W~~ind c~~C~~orrection a~~A~~ngles (WCAs), ~~and~~ d~~D~~rift and g~~G~~round s~~S~~peeds (GS). | X | X | X | X | X | | | |
| (07) | | Calculate individual and accumulated times for each leg to destination and alternate airfields. | X | X | X | X | X | | | |
| **033 02 00 00** | | **FLIGHT PLANNING FOR IFR FLIGHTS**<br>*Remark: Using training route manual IFR charts or the ECQB annexes.* | | | | | | | | |
| **033 02 01 00** | | **IFR navigation plan** | | | | | | | | |
| ***033 02 01 01*** | | ***~~Airways and routes~~ Air traffic service (ATS) routes*** | | | | | | | | Correct terminology |
| (01) | | Identify suitable routings by identifying all relevant aeronautical and regulatory information (including information published in the national aeronautical information publication (AIP)) required for IFR flight planning. ~~Select the preferred airway(s) or route(s) considering:~~<br>~~— altitudes and flight levels;~~<br>~~— standard routes;~~<br>~~— ATC restrictions;~~<br>~~— shortest distance;~~<br>~~— obstacles;~~ | X | | X | | | X | X | The list is worthless if it is followed by 'any other relevant data' |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — ~~any other relevant data.~~ | | | | | | | | |
| (02) New | | Identify and describe ATS routes (conventional, area navigation (RNAV), required navigation performance (RNP), conditional routes (CDRs), and direct routes). | X | | X | | | X | X | No high-level charts for helicopter |
| ***033 02 01 02*** | | ***Courses and distances from en-route charts*** | | | | | | | | |
| (01) | | Determine courses and distances. | X | | X | | | X | X | No high-level charts for helicopter |
| (02) | | Determine bearings and distances of waypoints from radio navigation aids. | X | | X | | | X | X | No high-level charts for helicopter |
| ***033 02 01 03*** | | ***Altitudes*** | | | | | | | | |
| (01) | | Define the following minimum altitudes:<br>— m~~M~~inimum e~~E~~n-route a~~A~~ltitude (MEA);<br>— m~~M~~inimum o~~O~~bstacle c~~C~~learance a~~A~~ltitude (MOCA);<br>— minimum sector altitude (MSA).<br>— ~~Minimum Off-Route Altitude (MORA);~~<br>— ~~Grid Minimum Off-Route Altitude (Grid MORA);~~<br>— ~~Maximum Authorised Altitude (MAA);~~<br>— ~~Minimum Crossing Altitude (MCA);~~<br>— ~~Minimum Holding Altitude (MHA).~~ | X | | X | | | X | X | As defined in Doc 8168<br>The deleted ones are from the Jeppesen Student Pilot Route Manual |
| (02) | | Extract the following minimum altitudes from the chart(s): | X | | X | | | X | X | As defined in Doc 8168 |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — ~~Minimum En route Altitude (~~MEA~~);~~<br>— ~~Minimum Obstacle Clearance Altitude (~~MOCA~~);~~<br>— MSA.<br>— ~~Minimum Off-Route Altitude (MORA);~~<br>— ~~Grid Minimum Off-Route altitude (Grid MORA);~~<br>— ~~Maximum Authorised Altitude (MAA);~~<br>— ~~Minimum Crossing Altitude (MCA);~~<br>— ~~Minimum Holding Altitude (MHA).~~ | | | | | | | | The deleted ones are from the Jeppesen Student Pilot Route Manual |
| (03) New | | State who is responsible for terrain separation during IFR flight inside and outside controlled airspace. | X | | X | | | X | X | |
| (04) New | | Sate the minimum obstacle clearance requirements for en-route IFR flight inside and outside controlled airspace. | X | | X | | | X | X | |
| (05) New | | State when a temperature error correction must be applied by either the pilot or ATC. | X | | X | | | X | X | |
| (06) New | | Identify and explain the use of minimum radar vector altitudes. | X | | X | | | X | X | |
| (07) New | | Calculate the minimum pressure altitude required with a given obstacle clearance, magnetic track, OAT, QNH and reduced vertical separation minimum (RVSM)/non-RVSM information. | X | | X | | | X | X | |
| (08) New | | Calculate true altitude from a given pressure altitude and | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | obstacle elevation using OAT and QNH. | | | | | | | | |
| ***033 02 01 04*** | | ***Standard ~~i~~Instrument d~~D~~epartures~~s~~ (SIDs~~)~~) and s~~S~~tandard instrument a~~A~~rrival (STAR) r~~R~~outes ~~(STARs)~~*** | | | | | | | | |
| (01) | X | State ~~Explain~~ the reasons for studying SID and STAR charts. | X | | X | | | X | X | |
| (02) | X | State ~~the reasons why~~ that SID and STAR charts show procedures only in a pictorial presentation style which is not to scale. | X | | X | | | X | X | |
| (03) | | Interpret all data and information represented on SID and STAR charts, particularly:<br>— routings,<br>— distances,<br>— courses,<br>— radials,<br>— altitudes/levels,<br>— frequencies,<br>— restrictions. | X | | X | | | X | X | |
| (04) | | Identify SID~~s~~ and STAR~~s~~ charts which might be relevant ~~to~~ for a planned flight. | X | | X | | | X | X | |
| ***033 02 01 05*** | | ***Instrument-approach charts*** | | | | | | | | |
| (01) | X | State the reasons for being familiar with instrument-approach procedures and appropriate data for departure, | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | destination and alternate airfields. | | | | | | | | |
| (02) | | Select instrument-approach procedures appropriate for departure, destination and alternate airfields. | X | | X | | | X | X | |
| (03) | | Interpret all procedures, data and information represented on instrument-approach charts, particularly:<br>— courses and radials;<br>— distances;<br>— altitudes/levels/heights;<br>— restrictions;<br>— obstructions;<br>— frequencies;<br>— speeds and times;<br>— d~~D~~ecision a~~A~~ltitudes/h~~H~~eights (DA/H);<br>— (DA/H) and m~~M~~inimum d~~D~~escent a~~A~~ltitudes/h~~H~~eights (MDA/H);<br>— visibility and r~~R~~unway v~~V~~isual r~~R~~anges (RVR);<br>— approach light systems. | X | | X | | | X | X | |
| (04) New | | Explain the following instrument approach procedures (IAPs) terms:<br>— type A and B;<br>— 2D and 3D; | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — CAT I, II and III;<br>— precision approach (conventional and ground-based augmentation system GBAS);<br>— non-precision approach (conventional and required navigation performance approach (RNP APCH) (lateral navigation (LNAV), LNAV/vertical navigation (VNAV), localiser performance (LP), localiser performance with vertical guidance (LPV), and required navigation performance authorisation required approach (RNP AR APCH));<br>— approach procedure with vertical guidance (APV) (APV Baro and APV satellite-based augmentation system (SBAS)). | | | | | | | | |
| ***033 02 01 06*** | | ***Communications and radio navigation planning data*** | | | | | | | | |
| (01) | | Find the communication frequencies and call signs for aeronautical services for IFR flights from en-route charts. ~~the following:~~<br>~~— control agencies and service facilities;~~<br>~~— Flight Information Services (FIS);~~<br>~~— weather information stations;~~<br>~~— Automatic Terminal Information Service (ATIS).~~ | X | | X | | | X | X | |
| (02) | | Find the frequency and/or identifiers of radio navigation aids for IFR flights from en-route charts. | X | | X | | | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***033 02 01 07*** | | ***Completion of a manual navigation plan*** | | | | | | | | |
| (01) | | Complete ~~the~~ a navigation plan with the courses, distances and frequencies taken from charts. | X | | X | | | X | X | There is no standard navigation plan |
| (02) | | Find the ~~Standard Instrument Departure~~ SID and ~~Arrival Routes~~ STAR routes to be flown and/or to be expected. | X | | X | | | X | X | Covered in 033 02 01 04 (04) |
| (03) | | Determine the position of t~~T~~op of c~~C~~limb (TO~~o~~C) and t~~T~~op of d~~D~~escent (TO~~o~~D) from given appropriate data. | X | | X | | | X | X | |
| (04) | | Determine variation and calculate magnetic/true courses. | X | | X | | | X | X | |
| (05) | | Calculate ~~True Airspeed (~~TAS~~)~~ from given aircraft performance data, altitude and ~~Outside-Air Temperature (~~OAT~~)~~. | X | | X | | | X | X | |
| (06) | | Calculate w~~W~~ind c~~C~~orrection a~~A~~ngles (WCAs)/d~~D~~rift and g~~G~~round s~~S~~peeds (GSs). | X | | X | | | X | X | |
| ~~LO (07)~~ | | ~~Determine all relevant altitudes/levels, and particularly MEA, MOCA, MORA, MAA, MCA, MRA and MSA~~. | ~~X~~ | | ~~X~~ | | | ~~X~~ | ~~X~~ | Covered in 033 02 01 03 (02) |
| (08) | | Calculate individual and accumulated times for each leg to destination and alternate airfields. | X | | X | | | X | X | |
| (09) | | Calculate average climb/descent GS, given TAS at various altitudes, wind velocity (W/V) at various altitudes and true track.<br>*Remark: TAS and W/V for climb calculations at the altitude two thirds of the level up the climb, and TAS and W/V for* | X | X | X | X | X | | | Moved from old 061 05 02 01 (01), (02), 061 05 02 02 (01), (02) and (03) |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | *descent calculations at the altitude halfway down the descent.* | | | | | | | | |
| (10) | | Calculate flying time and distance during climb/descent given average rate of climb/descent and using average GS. | X | X | X | X | X | | | Moved from old 061 05 02 02 (04), (07) and 061 05 02 03 (03) |
| (11) | | Given ground distance, average GS and levels, calculate average rate of climb/descent in order to reach a certain position at a given level. | X | X | X | X | X | | | Moved from old 061 05 02 02 (06), (08) and 061 05 02 03 (02) |
| (12) | | State that most aircraft operation manuals supply graphical material to calculate climb and descent problems. | X | X | X | X | X | | | Moved from 061 05 02 03 (01) |
| **033 03 00 00** | | **FUEL PLANNING** | | | | | | | | |
| **033 03 01 00** | | **General** | | | | | | | | |
| (01) | | Convert to volume, mass and density given in different units which are commonly used in aviation. | X | X | X | X | X | X | | |
| (02) | | Determine relevant data from the f~~F~~light m~~M~~anual, such as fuel capacity, fuel flow/consumption at different power/thrust settings, altitudes and atmospheric conditions. | X | X | X | X | X | X | | |
| (03) | | Calculate the attainable flight time/range from given average fuel flow/consumption and available amount of fuel. | X | X | X | X | X | X | | |
| (04) | | Calculate the required fuel from given average fuel | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | flow/consumption and required time/range to be flown. | | | | | | | | |
| (05) | | Calculate the required fuel for a VFR or IFR flight from given ~~expected~~ forecast meteorological conditions ~~and expected delays under defined conditions~~. | X | X | X | X | X | X | | |
| ~~LO (06)~~ | | ~~Calculate the required fuel for an IFR flight from given expected meteorological conditions and expected delays under defined conditions.~~ | ~~X~~ | | ~~X~~ | | | ~~X~~ | | Combined with 033 03 01 00 (05) |
| (07) New | | State the minimum amount of remaining fuel required on arrival at the destination and alternate airfields/heliports. | X | X | X | X | X | X | | |
| **033 03 02 00** | | **Pre-flight fuel planning for commercial flights** | | | | | | | | |
| ***033 03 02 01*** | | ***Taxiing fuel*** | | | | | | | | |
| (01) | | Determine the fuel required for engine start and taxiing by consulting the fuel-usage tables and/or graphs from the f~~F~~light m~~M~~anual taking into account all the relevant conditions. | X | X | X | X | X | | | |
| ***033 03 02 02*** | | ***Trip fuel*** | | | | | | | | |
| (01) | | Define trip fuel and name the segments of flight for which the trip fuel is relevant. | X | X | X | X | X | | | |
| (02) | | Determine the trip fuel for the flight by using data from the ~~navigation plan and~~ fuel tables and/or graphs from the f~~F~~light m~~M~~anual. | X | X | X | X | X | | | |
| ***033 03 02 03*** | | ***Reserve fuel and its components*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ***Contingency fuel*** | | | | | | | | |
| (01) | | Explain the reasons for having contingency fuel. | X | X | X | X | X | | | |
| ~~LO (02)~~ | | ~~State and explain the requirements for contingency fuel according to the applicable operational requirements.~~ | ~~X~~ | ~~X~~ | | | | | | Covered in 033 03 02 03 (03) |
| (03) | | Calculate the contingency fuel ~~by using requirements~~ according to the applicable operational requirements. | X | X | X | X | X | | | |
| ~~LO (04)~~ | | ~~State and explain the requirements for contingency fuel according to the applicable operational requirements~~. | | | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 03 02 03 (03) |
| ~~LO (05)~~ | | ~~Calculate the contingency fuel by using requirements according to the applicable operational requirements for IFR flights.~~ | | | ~~X~~ | | | | | Covered in 033 03 02 03 (03) |
| ~~LO (06)~~ | | ~~Calculate the contingency fuel by using requirements according to the applicable operational requirements for VFR flights in a hostile environment.~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 03 02 03 (03) |
| ~~LO (07)~~ | | ~~Calculate the contingency fuel by using requirements according to the applicable operational requirements for VFR flights in a non-hostile environment.~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 03 02 03 (03) |
| | | ***Alternate fuel*** | | | | | | | | |
| (08) | | Explain the reasons and regulations for having alternate fuel and name the segments of flight for which the alternate fuel is relevant. | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (09) | | Calculate the alternate fuel in accordance with the applicable operational requirements and relevant data from the navigation plan and the fFlight mManual. | X | X | X | X | X | | | |
| ~~LO (10)~~ | | ~~Calculate the alternate fuel in accordance with the applicable operational requirements and relevant data from the navigation plan and the Flight Manual~~. | | | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 03 02 03 (09) |
| | | ***Final reserve fuel*** | | | | | | | | |
| (11) | | Explain the reasons and regulations for having final reserve fuel. | X | X | X | X | X | | | |
| (12) | | Calculate the final reserve fuel for an ~~aeroplane~~ aircraft ~~with piston engines and for an aeroplane with turbine power units~~ in accordance with the applicable operational requirements and by using relevant data from the fFlight mManual. | X | X | X | X | X | | | |
| ~~LO (13)~~ | | ~~Calculate the final reserve fuel for a VFR flight (by day with reference to visual landmarks) in accordance with the applicable operational requirements and by using relevant data from the Flight Manual.~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 03 02 03 (12) |
| ~~LO (14)~~ | | ~~Calculate the final reserve fuel for a IFR flight in accordance with the applicable operational requirements and by using relevant data from the Flight Manual.~~ | | | ~~X~~ | | | | | Covered in 033 03 02 03 (12) |
| | | ***Additional fuel*** | | | | | | | | |
| (15) | | Explain the reasons and regulations for having additional | X | X | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | fuel. | | | | | | | | |
| (16) | | Calculate the additional fuel for a ~~an IFR~~ flight ~~without a destination alternate~~ in accordance with the applicable operational requirements ~~for an isolated aerodrome or heliport~~. | X | X | X | X | X | | | |
| ~~LO (17)~~ | | ~~Calculate the additional fuel for a flight to an isolated heliport in accordance with the applicable operational requirements.~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 03 02 03 (16) |
| ***033 03 02 04*** | | ***Extra fuel*** | | | | | | | | |
| (01) | | Explain the reasons and regulations for having extra fuel in accordance with the applicable operational requirements. | X | X | X | X | X | | | |
| ~~LO (02)~~ | | ~~Explain the reasons and regulations for having extra fuel in accordance with the applicable operational requirements.~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | | | Covered in 033 03 02 04 (01) |
| (03) | | Calculate the possible extra fuel under given conditions. | X | X | X | X | X | | | |
| ***033 03 02 05*** | | ***Calculation of total fuel and completion of the fuel section of the navigation plan (fuel ~~log~~ plan)*** | | | | | | | | |
| (01) | | Calculate the total fuel required for a flight. | X | X | X | X | X | | | |
| (02) | | Complete the fuel ~~log~~ plan. | X | X | X | X | X | | | |
| **033 03 03 00** | | **Specific fuel-calculation procedures** | | | | | | | | |
| ***033 03 03 01*** | | ***~~Decision-point procedure~~ Reduced contingency fuel procedure*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | X | Explain the reasons and regulations for the reduced contingency fuel ~~the decision-point procedure~~ as stated in the applicable operational requirements. | X | | | | | | | |
| (02) | | Calculate the contingency fuel and trip fuel required in accordance with the reduced contingency fuel ~~decision point~~ procedure. | X | | | | | | | |
| ***033 03 03 02*** | | ***Isolated aerodrome or heliport procedure*** | | | | | | | | |
| (01) | X | Explain the basic procedures for an isolated aerodrome or heliport as stated in the applicable operational requirements. | X | | X | X | | | | |
| (02) | | Calculate the additional fuel for aeroplanes or helicopters ~~with reciprocating engine~~s according to the isolated aerodrome or heliport procedures. | X | | X | X | | | | |
| ~~LO (03)~~ | | ~~Calculate the additional fuel for aeroplanes with turbine engines according to the isolated aerodrome procedures.~~ | ~~X~~ | | | | | | | Covered in 033 03 03 02 (02) |
| ***033 03 03 03*** | | ***Predetermined point procedure*** | | | | | | | | |
| (01) | X | Explain the basic idea of the predetermined-point procedure as stated in the applicable operational requirements. | X | | | | | | | |
| ~~LO (02)~~ | | ~~Calculate the additional fuel for aeroplanes with reciprocating engines according to the predetermined-point procedure~~. | ~~X~~ | | | | | | | Too uncommon |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ~~LO (03)~~ | | ~~Calculate the additional fuel for aeroplanes with turbine engines according to the predetermined-point procedure~~. | ~~X~~ | | | | | | | Too uncommon |
| ***033 03 03 04*** | | ***Fuel-tankering*** | | | | | | | | |
| (01) | | Explain the basic idea of fuel-tankering procedures. | X | | | | | | | |
| ~~LO (02)~~ | | ~~Explain that there is an optimum fuel quantity to be tankered (as a function of the fuel-price ratio between departure and destination airports and air distance to fly).~~ | ~~X~~ | | | | | | | Covered in 033 03 03 04 (01) |
| (03) | | Calculate how much fuel to tanker ~~tankered fuel~~ by using given appropriate graphs, tables and/or data. | X | | | | | | | |
| ***033 03 03 05*** | | ***Isolated heliport procedure*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the basic idea of the isolated heliport procedures as stated in the applicable operational requirements.~~ | | | ~~X~~ | ~~X~~ | | | | Covered in 033 03 03 02 (01) |
| ~~LO (02)~~ | | ~~Calculate the additional fuel according to the isolated heliport procedures as stated in the applicable operational requirements for flying IFR.~~ | | | ~~X~~ | | | | | Covered in 033 03 03 02 (02) |
| ~~LO (03)~~ | | ~~Calculate the additional fuel according to the isolated heliport procedures as stated in the applicable operational requirements for flying VFR and navigating by means other than by reference to visual landmarks.~~ | | | ~~X~~ | ~~X~~ | | | | Covered in 033 03 03 02 (02) |
| **033 04 00 00** | | **PRE-FLIGHT PREPARATION** | | | | | | | | |
| **033 04 01 00** | | **Notice to airmen (NOTAM) briefing** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***033 04 01 01*** | | ***Ground facilities and services*** | | | | | | | | |
| (01) | | Check that the ground facilities and services required for the planned flight are available and adequate. | X | X | X | X | X | X | X | |
| ***033 04 01 02*** | | ***Departure, destination and alternate aerodromes*** | | | | | | | | |
| (02) | | Find and analyse the latest state at the departure, destination and alternate aerodromes, in particular for:<br>— opening hours;<br>— w~~W~~ork in p~~P~~rogress (WIP);<br>— special procedures due to ~~Work in Progress (~~WIP~~)~~;<br>— obstructions;<br>— changes of frequencies for communications, navigation aids and facilities. | X | X | X | X | X | X | X | |
| ***033 04 01 03*** | | ***Airway routings and airspace structure*** | | | | | | | | |
| (01) | | Find and analyse the latest en-route state for:<br>— airway(s) or route(s);<br>— restricted, danger and prohibited areas;<br>— changes of frequencies for communications, navigation aids and facilities. | X | X | X | X | X | X | X | |
| ***033 04 01 04*** | | ***Selection of alternates*** | | | | | | | | New paragraph number<br>Paragraph moved from |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | | | | | | | | | old 071 01 03 01 |
| (01) | | State the circumstances in which a take-off alternate must be selected. | X | | | | | | | Moved from old 071 01 03 01 (04) and split |
| (02) | | State the maximum flight distance of a take-off alternate for: two-engine aeroplane, ETOPS-approved aeroplane, three- or four-engine aeroplane. | X | | | | | | | Moved from old 071 01 03 01 (04) |
| (03) | | State the factors to be considered in the selection of a take-off alternate. | X | | | | | | | Moved from old 071 01 03 01 (04) |
| (04) | | State when a destination alternate need not be selected. | X | | | | | | | Moved from old 071 01 03 01 (04) |
| (05) | | State when two destination alternates must be selected. | X | | | | | | | Moved from old 071 01 03 01 (04) |
| (06) | | State the factors to be considered in the selection of a destination alternate aerodrome. | X | | | | | | | Moved from old 071 01 03 01 (04) |
| (07) | | State the factors to be considered in the selection of an en-route alternate aerodrome. | X | | | | | | | Moved from old 071 01 03 01 (04) |
| **033 04 02 00** | | **Meteorological briefing** | | | | | | | | |
| ***033 04 02 01*** | | ~~***Extraction and analysis of relevant data from meteorological documents***~~<br>~~*Remark: This item is taught and examined in subject 050*~~. | | | | | | | | Moved to 050 |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***033 04 02 02*** | | ***Update of navigation plan using the latest meteorological information*** | | | | | | | | |
| (01) | | Confirm the ~~optimum~~ most fuel-efficient altitude~~/FL~~ from given wind, temperature and aircraft data. | X | X | X | X | X | X | X | Optimum altitude is best specific air range (SAR) |
| (02) | | Confirm true altitudes from given atmospheric data to ensure that statutory minimum clearance is attained. | X | X | X | X | X | X | | |
| (03) | | Confirm magnetic headings and GSs~~ground speeds~~. | X | X | X | X | X | X | X | |
| (04) | | Confirm the individual leg times and the total time en route. | X | X | X | X | X | X | X | |
| (05) | | Confirm the total time en route for the trip to the destination. | X | X | X | X | X | X | X | |
| (06) | | Confirm the total time from destination to the alternate airfield. | X | X | X | X | X | X | X | |
| ~~***033 04 02 03***~~ | | ~~***Update of mass and balance***~~<br>~~*Remark: This item is taught and examined in subject 031.*~~<br>***Intentionally left blank*** | | | | | | | | Moved to 031 |
| ~~***033 04 02 04***~~ | | ~~***Update of performance data***~~ ***Intentionally left blank***<br>~~*Remark: This item is taught and examined in subject 032 for aeroplanes and subject 034 for helicopters.*~~ | | | | | | | | Moved to 032/034 |
| ***033 04 02 05*** | | ***Update of fuel ~~log~~ plan*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | Calculate the revised fuel data in accordance with the changed conditions. | X | X | X | X | X | X | | |
| **033 04 03 00** | | **Point of eEqual tTime (PET) and pPoint of sSafe rReturn (PSR)** | | | | | | | | |
| ***033 04 03 01*** | | ***~~Point of Equal Time (PET)~~*** | | | | | | | | |
| (01) | | Define 'PET'. | X | | X | X | | | | |
| ~~LO (02)~~ | | ~~Explain the basic idea of determination of PET~~. | ~~X~~ | | ~~X~~ | ~~X~~ | | | | Covered in 033 04 03 01 (01) |
| (03) | | Calculate the position of a PET and the estimated time of arrival (ETA) at the PET from given relevant data. | X | | X | X | | | | |
| ***033 04 03 02*** | | ***~~Point of Safe Return (PSR)~~*** | | | | | | | | |
| (01) | | Define 'PSR'. | X | | X | X | | | | |
| ~~LO (02)~~ | | ~~Explain the basic idea of determination of PSR.~~ | X | | X | X | | | | Covered in 033 04 03 02 (02) |
| (03) | | Calculate the position of a PSR and the ETA at the PSR from given relevant data. | X | | X | X | | | | |
| **033 05 00 00** | | **ICAO FLIGHT PLAN (ATS fFlight pPlan)** | | | | | | | | |
| **033 05 01 00** | | **Individual fFlight pPlan** | | | | | | | | |
| ***033 05 01 01*** | | ***Format of fFlight pPlan*** | | | | | | | | |
| (01) | X | State the reasons for a fixed format of an ICAO ATS fFlight | X | X | X | X | X | X | X | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | p~~P~~lan (FPL). | | | | | | | | |
| (02) | | Determine the correct entries to complete an ATS FPL plus decode and interpret the entries in a completed ATS FPL, particularly for the following:<br>— aircraft identification (Item 7);<br>— flight rules and type of flight (Item 8);<br>— number and type of aircraft and wake-turbulence category (Item 9);<br>— equipment (Item 10);<br>— departure aerodrome and time (Item 13);<br>— route (Item 15);<br>— destination aerodrome, total estimated elapsed time and alternate aerodrome (Item 16);<br>— other information (Item 18);<br>— supplementary information (Item 19). | X | X | X | X | X | X | X | |
| ~~***033 05 01 02***~~ | | ~~***Completion of an ATS Flight Plan (FPL)***~~<br>***Intentionally left blank*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Complete the FPL by using the information from the following:~~<br>~~— navigation plan;~~<br>~~— fuel plan;~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | Covered in 033 05 01 01 (02) |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ~~— operator's records for basic aircraft information.~~ | | | | | | | | |
| ***033 05 02 00*** | | ***Repetitive f~~F~~light p~~P~~lan*** | | | | | | | | |
| (01) | X | Explain the difference between an i~~I~~ndividual f~~F~~light p~~P~~lan (FPL) and a r~~R~~epetitive f~~F~~light p~~P~~lan (RPL). | X | | X | X | | | | |
| ~~LO (02)~~ | | ~~Explain the basic idea of an RPL and state the general requirements for its use.~~ | ~~X~~ | | ~~X~~ | ~~X~~ | | | | Covered in 033 05 02 00 (01) |
| ~~**033 05 03 00**~~ | | ~~**Submission of an ATS Flight Plan (FPL)**~~<br>~~*Remark: This item is taught and examined in subject 010.*~~ | | | | | | | | Moved to 010 |
| ~~LO (01)~~ | | ~~Explain the requirements for the submission of an ATS Flight Plan.~~ | | | | | | | ~~X~~ | |
| ~~LO (02)~~ | | ~~Explain the actions to be taken in case of Flight Plan changes.~~ | | | | | | | ~~X~~ | |
| ~~LO (03)~~ | | ~~State the actions to be taken in case of inadvertent changes to Track, TAS and time estimate affecting the current Flight Plan.~~ | | | | | | | ~~X~~ | |
| ~~LO (04)~~ | | ~~Explain the procedures for closing a Flight Plan.~~ | | | | | | | ~~X~~ | |
| **033 06 00 00** | | **FLIGHT MONITORING AND IN-FLIGHT REPLANNING** | | | | | | | | |
| **033 06 01 00** | | **Flight monitoring** | | | | | | | | |
| ***033 06 01 01*** | | ***Monitoring of track and time*** | | | | | | | | |
| (01) | | State the reasons for possible deviations ~~to~~ from planned | X | X | X | X | X | X | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | track and planned timings. | | | | | | | | |
| ~~LO (02)~~ | | ~~Assess deviations from the planned course, headings (by maintaining desired courses) and times.~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | Not clear |
| (03) | | Calculate ~~the ground speed~~GS by using actual in-flight parameters. | X | X | X | X | X | X | | |
| (04) | | Calculate the expected leg times by using actual in-flight parameters. | X | X | X | X | X | X | | |
| (05) | | Calculate revised GS to reach a waypoint at a specific time. | X | X | X | X | X | | | Moved from old 061 05 03 01 (01) |
| (06) | | Calculate the average GS based on two observed fixes. | X | X | X | X | X | | | Moved from old 061 05 03 01 (02) |
| (07) | | Calculate the track angle error given course from A to B and an off-course fix, using the 1:60 rule. | X | X | X | X | X | | | Moved from old 061 05 03 02 (01) |
| (08) | | Calculate the heading change at an off-course fix to directly reach the next waypoint using the 1:60 rule. | X | X | X | X | X | | | Moved from old 061 05 03 02 (02) |
| (09) | | Calculate the average drift angle based upon an off-course fix observation. | X | X | X | X | X | | | Moved from old 061 05 03 02 (03) |
| (10) | | Enter revised navigational en-route data, for the legs concerned, into the flight plan (e.g. updated wind and GS and correspondingly losses or gains in time and fuel consumption). | X | X | X | X | X | | | Moved from old 061 05 04 00 (02) |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (11) | | Enter, in the progress of flight, at checkpoint or turning point, the 'actual time-over' and the 'estimated time-over' for the next checkpoint into the flight plan. | X | X | X | X | X | | | Moved from old 061 05 04 00 (03) |
| (12) | | State that it is necessary to determine the position of the aircraft accurately before commencing descent in order to ensure safe ground clearance. | X | X | X | X | X | | | Moved from old 061 05 02 04 (05) |
| (13) | | Estimate average climb/descent gradient (%) or glide path degrees according to the following rule of thumb:<br>Gradient in degrees = (vertical distance (ft) / 100) / ground distance (nm))<br>Gradient in % = (vertical distance (ft) / 60) / ground distance (nm))<br>*N.B. These rules of thumb approximate 1 nm to 6 000 ft and are based on the 1:60 rule.* | X | X | X | X | X | | | Moved from old 061 05 02 04 (01), (02) and (03) |
| (14) | | Calculate rate of descent (ROD) on a given glide-path angle or gradient using the following rule of thumb formulae:<br>ROD (ft/min) = GP° × GS (nm/min) × 100<br>ROD (ft/min) = GP% × GS (kt) | X | X | X | X | X | | | Moved from old 061 05 02 04 (04) and 061 05 02 04 (01) |
| (15) New | | Calculate revised ETAs based on changes to the pre-flight plan including changes of W/V, cruise level, OAT, distances, Mach number and calibrated airspeed (CAS). | X | X | X | X | X | | | No Mach number calculations for helicopter |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***033 06 01 02*** | | ***In-flight fuel management*** | | | | | | | | |
| (01) | | Explain why fuel checks must be carried out in flight at regular intervals and why relevant fuel data must be recorded. | X | X | X | X | X | X | | |
| (02) | | Assess deviations of actual fuel consumption from planned consumption. | X | X | X | X | X | X | | |
| ~~LO (03)~~ | | ~~State the reasons for possible deviations~~. | X | X | X | X | X | X | | Covered in 033 06 01 02 (02) |
| (04) | | Calculate the fuel quantities used, fuel consumption and fuel remaining at navigation checkpoints/waypoints. | X | X | X | X | X | X | | |
| (05) | | Compare the actual with the planned fuel consumption by means of calculation ~~or flight-progress chart~~. | X | X | X | X | X | X | | |
| (06) | | Determine ~~Assess~~ the remaining range and endurance by means of calculation ~~or flight-progress chart~~. | X | X | X | X | X | X | | |
| (07) New | | Calculate revised fuel consumption based on changes to the pre-flight plan including changes of W/V, cruise level, OAT, distances, Mach number and CAS. | X | X | X | X | X | X | | No Mach number calculations for helicopter |
| ***~~033 06 01 03~~*** | | ***~~Monitoring of primary flight parameters~~*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Explain the methodology for monitoring of primary flight parameters during the application of the procedures requiring a high flight crew workload within a short time frame (including monitoring of primary flight parameters, in~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | Practical flight training |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ~~particular pitch, thrust and speed~~). | | | | | | | | |
| ***033 06 02 00*** | | ***In-flight replanning in case of deviation from planned data*** | | | | | | | | |
| (01) | | State ~~Justify~~ that the commander is responsible that even in case of diversion the remaining fuel is not less than the fuel required to proceed to an aerodrome where a safe landing can be made, with final reserve fuel remaining. | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | |
| ~~LO (02)~~ | | ~~Perform in-flight updates, if necessary, based on the results of in-flight monitoring, specifically by:~~<br>~~— selecting a new destination/alternate aerodrome;~~<br>~~— adjusting flight parameters and power settings~~. | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | ~~X~~ | | | Practical flight training |
| (03) | | Explain ~~why~~ that, in the case of an in-flight update, the commander has to check the following:<br>— the suitability of the new destination and/or alternate aerodrome;<br>— meteorological conditions on revised routing and at revised destination and/or alternate aerodrome;<br>— the aircraft must be able to land with the prescribed final reserve fuel. | X | X | X | X | X | | | |
| (04) | | Calculate ~~Assess~~ the revised destination/alternate aerodrome landing mass from given latest data. | X | X | X | X | X | | | |

## Overview of the proposed amendments to Subject 034 'Performance (helicopter)'

Some subjects are excluded for the commercial pilot licence (helicopters) (CPL(H)) because they are the subject of the First Multi-Engine Pre-Entry Conversion Course. Learning Objectives (LOs) mentioning $V_1$ have been changed as $V_1$ is not used in helicopter take-offs.

A minimum number of changes was proposed to this subject area. Three LOs were proposed for deletion, no new LOs have been introduced, and no LO has been marked as basic knowledge (BK) either.

**SUBJECT 034 — PERFORMANCE (HELICOPTER)**

~~(1) For mass definitions, please refer to Chapter D.~~

*Note that the term 'mass' is used to describe a quantity of matter, and 'weight' when describing the force. However, the term 'weight' is normally used in aviation to colloquially describe mass. The professional pilot should always note the units to determine if the term 'weight' is being used to describe a force (e.g. unit newton) or quantity of matter (e.g. unit kilogram).*

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **030 00 00 00** | | **FLIGHT PERFORMANCE AND PLANNING** | | | | | | | | Some subjects are excluded for the CPL(H) because they are the subject of the First Multi-Engine Pre-Entry Conversion Course |
| **034 00 00 00** | | **PERFORMANCE — HELICOPTER** | | | | | | | | |
| **034 01 00 00** | | **GENERAL** | | | | | | | | |
| **034 01 01 00** | | **Performance legislation** | | | | | | | | |
| ***034 01 01 01*** | | ***Airworthiness requirements*** | | | | | | | | |
| (01) | | Interpret the airworthiness requirements in CS-27 and CS-29~~ as related to helicopter performance~~. | | | X | X | X | | | |
| (02) | | Name the general differences between helicopters as certified according to CS-27 and CS-29. | | | X | X | X | | | |
| ***034 01 01 02*** | | ***Operational regulations*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | State the responsibility ~~to~~for complying with ~~the~~ operational procedures. | | | X | X | X | | | |
| ~~LO (02)~~ | | ~~Interpret the European Union regulation on operations.~~ | | | ~~X~~ | ~~X~~ | ~~X~~ | | | LO not specific enough |
| (03) | | Use and interpret diagrams and tables associated with CAT A and CAT B procedures in order to select and develop C~~c~~lass 1, 2 and 3 performance profiles according to available heliport size and location (surface or elevated). | | | X | X | | | | The only real profile for Category B/ Performance Class 3 is the height/velocity curve |
| ~~LO (04)~~ | | ~~Use and interpret diagrams and tables associated with CAT B procedures in order to select and develop Performance Class 3 single-engine helicopter performance profiles according to available heliport size and location (surface or elevated).~~ | | | | | ~~X~~ | | | Operation in Performance Class 3 is not allowed from elevated heliports |
| (05) | | Interpret the charts showing minimum clearances associated with CAT~~Category~~ A & B procedures. | | | X | X | | | | |
| **034 01 02 00** | | **General performance theory** | | | | | | | | |
| ***034 01 02 01*** | | ***Stages of flight*** | | | | | | | | |
| (01) | | Explain the following stages of flight:<br>— take-off;<br>— climb;<br>— level flight;<br>— descent; | | | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — approach and landing. | | | | | | | | |
| (02) | | Describe the necessity for different take-off and landing procedures. | | | X | X | X | | | |
| ***034 01 02 02*** | | ***Definitions and terms*** | | | | | | | | |
| (01) | | Define the following terms:<br>— CAT~~Category~~ A;<br>— CAT~~Category~~ B;<br>— p~~P~~erformance c~~C~~lass 1, 2 and 3;<br>— congested area;<br>— elevated heliport;<br>— helideck;<br>— heliport;<br>— hostile environment;<br>— maximum ~~approved~~ operational passenger seating configuration (MOPSC);<br>— non-hostile environment;<br>— obstacle;<br>— rotor r~~R~~adius (R);<br>— take-off mass;<br>— t~~T~~ouchdown and l~~L~~ift-o~~O~~ff a~~A~~rea (TLOF); | | | X | X | X | | | The term 'operational' is used in Annex 1 to Commission Regulation (EU) No 965/2012 on air operations |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — safe forced landing;<br>— speed for best rate of climb ($V_Y$);<br>— never exceed speed ($V_{NE}$);<br>— velocity landing gear extended ($V_{LE}$);<br>— velocity landing gear operation ($V_{LO}$);<br>— cruising speed and maximum cruising speed. | | | | | | | | |
| (02) | | Define the following terms:<br>— reported headwind component;<br>— tTake-off dDecision pPoint (TDP);<br>— dDefined pPoint aAfter tTake-oOff (DPATO);<br>— tTake-oOff dDistance rRequired helicopter (TODRH);<br>— tTake-oOff dDistance aAvailable helicopter (TODAH);<br>— dDistance rRequired (DR);<br>— rRejected tTake-oOff dDistance rRequired (helicopter) (RTODRH);<br>— rRotation pPoint (RP);<br>— cCommittal pPoint (CP);<br>— dDefined pPoint bBefore lLanding (DPBL);<br>— lLanding dDecision pPoint (LDP); | | | X | X | | | | This is the term used in Regulation (EU) No 965/2012 |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — ~~L~~anding d~~D~~istance a~~A~~vailable helicopter (LDA~~H~~);<br>— ~~L~~anding d~~D~~istance r~~R~~equired helicopter (LDR~~H~~);<br>~~— Take-off safety speed ($V_1$);~~<br>~~— Take-off safety speed for Cat A rotorcraft ($V_{TOSS}$)($V_2$).;~~<br>— ditching (see operations). | | | | | | | | Helicopters do not use $V_1$ or $V_2$<br>Add ditching because of the use of helidecks |
| (03) | | Understand the meaning and significance of the acronyms AEO and OEI. | | | X | X | | | | |
| (04) | | Define the terms ‘climb angle’ and ‘climb gradient’. | | | X | X | | | | |
| (05) | | Define the terms ‘flight-path angle’ and ‘flight-path gradient’. | | | X | X | | | | |
| (06) | | Define ‘$V_{maxRange}$’ (speed for maximum range) and $V_{maxEnd}$ (speed for maximum endurance). | | | X | X | X | | | |
| (07) | | Define and calculate the gradient by using power, wind and helicopter mass. | | | X | X | | | | |
| (08) | | Explain the terms ‘operational ceiling’ and ‘absolute ceiling’. | | | X | X | X | | | |
| (09) | | Explain the term ‘service ceiling OEI’. | | | X | X | X | | | |
| (10) | | ~~Understand~~ Explain the difference between h~~H~~overing i~~I~~n g~~G~~round e~~E~~ffect (HIGE) and h~~H~~overing out of g~~G~~round e~~E~~ffect (HOGE). | | | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| ***034 01 02 03*** | | ***Power required/power available curves*** | | | | | | | | |
| (01) | | Understand and interpret the ~~graph~~ power required /power available versus TAS graphs. | | | X | X | X | | | |
| ***034 01 02 04*** | | ***~~Critical~~ Height–~~v~~Velocity graphs*** | | | | | | | | |
| (01) | | Understand and interpret ~~the critical~~ height–~~-~~velocity graphs. | | | X | X | X | | | |
| ***034 01 02 05*** | | ***Influencing variables on performance*** | | | | | | | | |
| (01) | | Explain how the following factors a~~e~~ffect helicopter performance:<br>— pressure altitude;<br>— humidity;<br>— temperature;<br>— wind;<br>— helicopter mass;<br>— helicopter configuration;<br>— helicopter centre of gravity (CG). | | | X | X | X | | | |
| **034 02 00 00** | | **PERFORMANCE CLASS 3 — SINGLE-ENGINE HELICOPTERS ONLY** | | | | | | | | |
| **034 02 01 00** | | **Effect of variables on single-engine helicopter performance** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | Determine wind component, altitude and temperature for hovering, take-off and landing. | | | X | X | X | | | |
| (02) | | Explain that operations are only from/to heliports and over such routes, areas and diversions contained in a non-hostile environment where a safe forced landing can be carried out. (CAT.POL.H.420)<br>(Consider the exception: Operations may be conducted in a hostile environment ~~when approved~~). | | | X | X | X | | | When there are several choices of landing sites — see Annex 1 to Commission Regulation (EU) No 965/2012 |
| (03) | | Explain the effect of temperature, wind and altitude on climb, cruise and descent performance. | | | X | X | X | | | |
| **034 02 02 00** | | **Take-off and landing (including hover)** | | | | | | | | |
| (01) | | Explain the take-off and landing requirements. | | | X | X | X | | | |
| (02) | | Explain the maximum allowed take-off and landing mass. | | | X | X | X | | | |
| (03) | | Explain that mass has to be restricted to HIGE. | | | X | X | X | | | |
| (04) | | Explain that if HIGE is unlikely to be achieved (for example, blocked by an obstruction), then mass must be restricted to HOGE. | | | X | X | X | | | |
| **034 02 03 00** | | **Climb, cruise and descent** | | | | | | | | |
| (01) | | State that the helicopter must be capable of flying its intended track without flying below the appropriate minimum flight altitude and be able to perform a safe | | | X | X | X | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | forced landing. | | | | | | | | |
| (02) | | Explain the effect of altitude on the maximum endurance speed. | | | X | X | X | | | |
| **034 02 04 00** | | **Use of helicopter performance data** | | | | | | | | |
| ***034 02 04 01*** | | ***Take-off (including hover)*** | | | | | | | | |
| (01) | | Find the maximum wind component. | | | X | X | X | | | |
| (02) | | Find the maximum allowed take-off mass for certain conditions. | | | X | X | X | | | |
| (03) | | Find the ~~critical~~ height–~~-~~velocity parameters. | | | X | X | X | | | |
| ***034 02 04 02*** | | ***Climb*** | | | | | | | | |
| (01) | | Find the time, distance and fuel to climb for certain conditions. | | | X | X | X | | | |
| (02) | | Find the rate of climb under given conditions and the best rate-of-climb speed $V_Y$. | | | X | X | X | | | |
| ***034 02 04 03*** | | ***Cruise*** | | | | | | | | |
| (01) | | Find the cruising speed and fuel consumption for certain conditions. | | | X | X | X | | | |
| (02) | | Calculate the range and endurance under given conditions. | | | X | X | X | | | |
| ***034 02 04 04*** | | ***Landing (including hover)*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | Find the maximum wind component. | | | X | X | X | | | |
| (02) | | Find the maximum allowed landing mass for certain conditions. | | | X | X | X | | | |
| (03) | | Find the ~~critical~~ height ~~–~~ velocity parameters. | | | X | X | X | | | |
| **034 03 00 00** | | **PERFORMANCE CLASS 2** | | | | | | | | |
| | | *General remark: The Learning Objectives for Performance Class 2 are principally identical with those of Performance Class 1. (See 034 04 00 00)*<br>*Additional Learning Objectives are shown below.* | | | | | | | | |
| **034 03 01 00** | | **Operations without an assured safe forced landing capability** | | | | | | | | |
| (01) | | State the responsibility of the operator ~~in order to assure a~~ for assuring safe forced landings. | | | X | X | | | | |
| **034 03 02 00** | | **Take-off** | | | | | | | | |
| (01) | | State the climb and other requirements for take-off. | | | X | X | | | | |
| **034 03 03 00** | | **Take-off f~~F~~light p~~P~~ath** | | | | | | | | |
| (01) | | State the height above the take-off surface at which at least the requirements for the take-off flight path for Performance Class 1 are to be met. | | | X | X | | | | |
| **034 03 04 00** | | **Landing** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| (01) | | State the requirements for the climb capability ~~for~~when OEI. | | | X | X | | | | |
| (02) | | State the options for a Performance Class 2 operation in the case of a critical power-unit failure at any point in the approach path. | | | X | X | | | | |
| (03) | | State the limitations for operations to/from a helideck. | | | X | X | | | | |
| **034 04 00 00** | | **PERFORMANCE CLASS 1 — HELICOPTERS CERTIFIED~~CERTIFICATED~~ ACCORDING TO CS-29 ONLY** | | | | | | | | |
| **034 04 01 00** | | **Take-off** | | | | | | | | |
| ***034 04 01 01*** | | ***Take-off distances*** | | | | | | | | |
| (01) | | Explain the effects of the following variables on the flight-path and take-off distances:<br>— take-off with HIGE or HOGE;<br>— take-off procedure;<br>— obstacle clearances both laterally and vertically;<br>— take-off from non-elevated heliports;<br>— take-off from elevated heliports or helidecks;<br>— take-off from a ~~Touchdown and Lift-Off Area (~~TLOF~~)~~. | | | X | X | | | | |
| (02) | | Explain the effects of the following variables on take-off distances: | | | X | X | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | — mass;<br>— take-off configuration;<br>— bleed-air configurations. | | | | | | | | |
| (03) | | Explain the effects of the following meteorological conditions ~~variables~~ on take-off distances:<br>— wind;<br>— temperature;<br>— pressure altitude. | | | X | X | | | | |
| (04) | | Explain the take-off distances for specified conditions and configuration for AEO and OEI. | | | X | X | | | | |
| (05) | | Explain the effect of obstacles on the take-off distance required. | | | X | X | | | | |
| (06) | | ~~Explain the influence of $V_1$ and $V_{TOSS}$ speeds on the take-off distance.~~ | | | ~~X~~ | ~~X~~ | | | | |
| (07) | | State the assumed reaction time between engine failure and recognition. | | | X | X | | | | |
| ~~LO (08)~~ | | ~~Explain the effect of calculation of TDP and $V_1$ on the take-off distance required.~~ | | | ~~X~~ | ~~X~~ | | | | TDP is a fixed point and $V_1$ is not used |
| (09) | | Explain that the flight must be carried out visually up to TDP. | | | X | X | | | | |
| ***034 04 01 02*** | | ***Rejected take-off distance required (helicopter)*** | | | | | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | ***(RTODR(H))*** | | | | | | | | |
| (01) | | Explain RTODR(H)~~the rejected take-off distance required~~ for specified conditions and configuration for AEO and OEI. | | | X | X | | | | |
| ~~LO (02)~~ | | ~~Explain the effect of calculation of $V_1$ on the rejected take-off distance required.~~ | | | ~~X~~ | ~~X~~ | | | | |
| (03) | | Explain the time-to-decide allowance (decision time) and deceleration procedure. | | | X | X | | | | |
| ***~~034 04 01 03~~*** | | ***~~Landing distance from TDP with $V_1$ to a complete stop on the ground~~*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Understand the relationship of take-off distance and landing distance from TDP with $V_1$ to a complete ground stop.~~ | | | ~~X~~ | ~~X~~ | | | | |
| ***034 04 01 04*** | | ***Take-off climb*** | | | | | | | | |
| (01) | | Define the segments of the take-off flight path. | | | X | X | | | | |
| (02) | | Explain the effect of changes in the configuration on power and speed in the segments. | | | X | X | | | | |
| (03) | | Explain the climb-gradient requirements for OEI. | | | X | X | | | | |
| (04) | | State the minimum altitude over the take-off path when flying at ~~$V_1$ to~~$V_{TOSS}$. | | | X | X | | | | |
| (05) | | Describe the influence of airspeed selection, acceleration and turns on the climb gradient and best | | | X | X | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | rate-of-climb speed. | | | | | | | | |
| ***034 04 01 05*** | | ***Obstacle-limited take-off*** | | | | | | | | |
| (01) | | Describe the operational regulations for obstacle clearance of the take-off flight path in the departure sector with OEI. | | | X | X | | | | |
| ***034 04 01 06*** | | ***Use of helicopter flight data*** | | | | | | | | |
| ~~LO (01)~~ | | ~~Determine from the helicopter performance data sheets the maximum masses that satisfy all the regulations for take-off.~~ | | | ~~X~~ | ~~X~~ | | | | Too wide<br>Not enough guidance for schools to teach anything<br>There are several masses that satisfy some regulations,<br>but not all of them |
| **034 04 02 00** | | **Climb** | | | | | | | | |
| ***034 04 02 01*** | | ***Climb techniques*** | | | | | | | | |
| (01) | | Explain the effect of climbing with best rate-of-climb speed ($V_Y$). | | | X | X | | | | |
| (02) | | Explain the influence of altitude on $V_Y$. | | | X | X | | | | |
| ***034 04 02 02*** | | ***Use of helicopter flight data*** | | | | | | | | |
| (01) | | Find the rate of climb and calculate the time to climb to a given altitude. | | | X | X | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| **034 04 03 00** | | **Cruise** | | | | | | | | |
| ***034 04 03 01*** | | ***Cruise techniques*** | | | | | | | | |
| (01) | | Explain the cruise procedures for 'maximum endurance' and 'maximum range'. | | | X | X | | | | |
| ***034 04 03 02*** | | ***Maximum endurance*** | | | | | | | | |
| (01) | | Explain fuel flow in relation to true airspeed (TAS). | | | X | X | | | | |
| (02) | | Explain the speed for maximum endurance. | | | X | X | | | | |
| ***034 04 03 03*** | | ***Maximum range*** | | | | | | | | |
| (01) | | Explain the speed for maximum range. | | | X | X | | | | |
| ***034 04 03 04*** | | ***Maximum cruise*** | | | | | | | | |
| (01) | | Explain the speed for maximum cruise. | | | X | X | | | | |
| ***034 04 03 05*** | | ***Cruise altitudes*** | | | | | | | | |
| (01) | | Explain the factors which might affect or limit the operating altitude. | | | X | X | | | | |
| (02) | | Understand the relation between power setting, fuel consumption, cruising speed and altitude. | | | X | X | | | | |
| ***034 04 03 06*** | | ***Use of helicopter flight data*** | | | | | | | | |
| (01) | | Determine the fuel consumption from the helicopter performance data sheets in accordance with altitude | | | X | X | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | and helicopter mass. | | | | | | | | |
| **034 04 04 00** | | **En-route one engine inoperative (OEI)** | | | | | | | | |
| ***034 04 04 01*** | | ***Requirements for en-route flights for OEI*** | | | | | | | | |
| (01) | | State the flight-path clearance requirements. | | | X | X | | | | |
| (02) | | Explain ~~the~~ drift-down techniques. | | | X | X | | | | |
| (03) | | State the reduction in the flight-path width when navigational accuracy can be achieved. | | | X | X | | | | |
| ***034 04 04 02*** | | ***Use of helicopter flight data*** | | | | | | | | |
| (01) | | Find the single-engine service ceiling, range and endurance from given engine-inoperative charts. | | | X | X | | | | |
| (02) | | Find the maximum continuous power settings from given engine-inoperative charts. | | | X | X | | | | |
| (03) | | Find the amount of fuel to be jettisoned to reduce helicopter mass. | | | X | X | | | | |
| (04) | | Calculate the relevant parameters for drift-down procedures. | | | X | X | | | | |
| **034 04 05 00** | | **Descent** | | | | | | | | |
| ***034 04 05 01*** | | ***Use of helicopter flight data*** | | | | | | | | |
| (01) | | Find the rate of descent and calculate the time to descent to a given altitude. | | | X | X | | | | |

| Syllabus reference | BK | Syllabus details and associated Learning Objectives | Aeroplane | | Helicopter | | | IR | CBIR(A) & EIR | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ATPL | CPL | ATPL /IR | ATPL | CPL | | | |
| | | | | | | | | | | |
| **034 04 06 00** | | **Landing** | | | | | | | | |
| ***034 04 06 01*** | | ***Landing requirements*** | | | | | | | | |
| (01) | | State the requirements for landing. | | | X | X | | | | |
| ***034 04 06 02*** | | ***Landing procedures*** | | | | | | | | |
| (01) | | Explain the procedure for critical power-unit failure ~~prior to~~ before and after the landing decision point. | | | X | X | | | | |
| (02) | | Explain that the portion of flight after the landing decision point must be carried out visually. | | | X | X | | | | |
| (03) | | Explain the procedures and required obstacle clearances for landings on different heliports/helidecks. | | | X | X | | | | |
| ***034 04 06 03*** | | ***Use of helicopter flight data*** | | | | | | | | |
| (01) | | Determine from the helicopter performance data sheets the maximum masses that satisfy all the regulations for landing. | | | X | X | | | | |