## F. SUBJECT 033 — FLIGHT PLANNING AND MONITORING

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

| Syllabus reference | Syllabus details and associated Learning Objectives | *Aeroplane* | | *Helicopter* | | | *IR* |
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| | | 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** | | | | | | |
| LO | Select routes and altitudes taking the following criteria into account:<br>— classification of airspace;<br>— controlled airspace;<br>— uncontrolled airspace;<br>— restricted areas;<br>— minimum safe altitude;<br>— VFR semicircular rules;<br>— conspicuous points;<br>— navigation aids. | x | x | x | x | x | |
| LO | Calculate the minimum pressure or true altitude from minimum grid-area altitude using OAT and QNH. | x | x | x | x | x | |
| LO | Calculate the vertical and/or horizontal distance and time to climb to a given level or altitude. | x | x | x | x | x | |
| LO | Calculate the vertical and/or horizontal distance and time to descend from a given level or altitude. | x | x | x | x | x | |
| LO | Find the frequency and/or identifiers of radio-navigation aids from charts. | x | x | x | x | x | |
| **033 01 01 02** | **Courses and distances from VFR charts** | | | | | | |
| LO | Choose waypoints in accordance with specified criteria. | x | x | x | x | x | |
| LO | Calculate, or obtain from the chart, courses and distances. | x | x | x | x | x | |

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| LO | Find the highest obstacle within a given distance on either side of the course. | x | x | x | x | x | |
| LO | Find the following data from the chart and transfer them to the navigation plan:<br>— waypoints and/or turning points;<br>— distances;<br>— true/magnetic courses. | x | x | x | x | x | |
| **033 01 01 03** | **Aerodrome charts and aerodrome directory** | | | | | | |
| LO | Explain the reasons for studying the visual departure procedures and the available approach procedures. | x | x | x | x | x | |
| LO | Find all visual procedures which can be expected at the departure, destination and alternate airfields. | x | x | x | x | x | |
| LO | Find 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);<br>— any other relevant information. | x | x | x | x | x | |
| **033 01 01 04** | **Communications and radio-navigation planning data** | | | | | | |
| LO | 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 | |
| LO | Find the frequency and/or identifier of the appropriate radio-navigation aids. | x | x | x | x | x | |
| **033 01 01 05** | **Completion of navigation plan** | | | | | | |

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| LO | Complete the navigation plan with the courses and distances as taken from charts. | x | x | x | x | x | |
| LO | Find the departure and arrival routes. | x | x | x | x | x | |
| LO | Determine the position of Top of Climb (ToC) and Top of Descend (ToD) from given appropriate data. | x | x | x | x | x | |
| LO | Determine variation and calculate magnetic courses. | x | x | x | x | x | |
| LO | Calculate the True Airspeed (TAS) from given aircraft performance data, altitude and Outside-Air Temperature (OAT). | x | x | x | x | x | |
| LO | Calculate Wind Correction Angles (WCA) and Drift and Ground Speeds (GS). | x | x | x | x | x | |
| LO | 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** | | | | | | |
| LO | 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;<br>— any other relevant data. | x | | x | | | x |
| **033 02 01 02** | **Courses and distances from en route charts** | | | | | | |
| LO | Determine courses and distances. | x | | x | | | x |
| LO | Determine bearings and distances of waypoints from radio-navigation aids. | x | | x | | | x |

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| **033 02 01 03** | **Altitudes** | | | | | | |
| LO | Define the following minimum altitudes:<br>— Minimum En route Altitude (MEA);<br>— Minimum Obstacle-Clearance Altitude (MOCA);<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 |
| LO | Extract the following minimum altitudes from the chart(s):<br>— Minimum En route Altitude (MEA);<br>— Minimum Obstacle-Clearance Altitude (MOCA);<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 |
| **033 02 01 04** | **Standard Instrument Departures (SIDs) and Standard Arrival Routes (STARs)** | | | | | | |
| LO | Explain the reasons for studying SID and STAR charts. | x | | x | | | x |
| LO | State the reasons why SID and STAR charts show procedures only in a pictorial presentation style which is not to scale. | x | | x | | | x |
| LO | Interpret all data and information represented on SID and STAR charts, particularly:<br>— routings,<br>— distances,<br>— courses,<br>— radials,<br>— altitudes/levels, | x | | x | | | x |

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| | — frequencies,<br>— restrictions. | | | | | | |
| LO | Identify SIDs and STARs which might be relevant to a planned flight. | x | | x | | | x |
| **033 02 01 05** | **Instrument-approach charts** | | | | | | |
| LO | State the reasons for being familiar with instrument-approach procedures and appropriate data for departure, destination and alternate airfields. | x | | x | | | x |
| LO | Select instrument-approach procedures appropriate for departure, destination and alternate airfields. | x | | x | | | x |
| LO | 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>— Decision Altitudes/Heights (DA/H);<br>— (DA/H) and Minimum Descent Altitudes/Heights (MDA/H);<br>— visibility and Runway Visual Ranges (RVR);<br>— approach light systems. | x | | x | | | x |
| **033 02 01 06** | **Communications and radio-navigation planning data** | | | | | | |
| LO | 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 |
| LO | Find the frequency and/or identifiers of radio-navigation aids. | x | | x | | | x |

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| **033 02 01 07** | **Completion of navigation plan** | | | | | | |
| LO | Complete the navigation plan with the courses, distances and frequencies taken from charts. | x | | x | | | x |
| LO | Find the Standard Instrument Departure and Arrival Routes to be flown and/or to be expected. | x | | x | | | x |
| LO | Determine the position of Top of Climb (ToC) and Top of Descent (ToD) from given appropriate data. | x | | x | | | x |
| LO | Determine variation and calculate magnetic/true courses. | x | | x | | | x |
| LO | Calculate True Airspeed (TAS) from given aircraft performance data, altitude and Outside-Air Temperature (OAT). | x | | x | | | x |
| LO | Calculate Wind Correction Angles (WCA) / Drift and Ground Speeds (GS). | x | | x | | | x |
| LO | Determine all relevant altitudes/levels, and particularly MEA, MOCA, MORA, MAA, MCA, MRA and MSA. | x | | x | | | x |
| LO | Calculate individual and accumulated times for each leg to destination and alternate airfields. | x | | x | | | x |
| **033 03 00 00** | **FUEL PLANNING** | | | | | | |
| **033 03 01 00** | **General** | | | | | | |
| LO | Convert to volume, mass and density given in different units which are commonly used in aviation. | x | x | x | x | x | x |
| LO | Determine relevant data from the Flight Manual, such as fuel capacity, fuel flow/consumption at different power/ thrust settings, altitudes and atmospheric conditions. | x | x | x | x | x | x |
| LO | Calculate the attainable flight time/range from given fuel flow/ consumption and available amount of | x | x | x | x | x | x |

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| | fuel. | | | | | | |
| LO | Calculate the required fuel from given fuel flow/consumption and required time/range to be flown. | x | x | x | x | x | x |
| LO | Calculate the required fuel for a VFR flight from given expected meteorological conditions and expected delays under defined conditions. | x | x | x | x | x | x |
| LO | Calculate the required fuel for an IFR flight from given expected meteorological conditions and expected delays under defined conditions. | x | | x | | | x |
| **033 03 02 00** | **Pre-flight fuel planning for commercial flights** | | | | | | |
| **033 03 02 01** | **Taxiing fuel** | | | | | | |
| LO | Determine the fuel required for engine start and taxiing by consulting the fuel-usage tables and/or graphs from the Flight Manual taking into account all the relevant conditions. | x | x | x | x | x | |
| **033 03 02 02** | **Trip fuel** | | | | | | |
| LO | Define 'trip fuel' and name the segments of flight for which the trip fuel is relevant. | x | x | x | x | x | |
| LO | Determine the trip fuel for the flight by using data from the navigation plan and fuel tables and/or graphs from the Flight Manual. | x | x | x | x | x | |
| **033 03 02 03** | **Reserve fuel and its components** | | | | | | |
| | ***Contingency fuel*** | | | | | | |
| LO | Explain the reasons for having contingency fuel. | x | x | x | x | x | |
| LO | State and explain the requirements for contingency fuel according to the applicable operational requirements. | x | x | | | | |

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| LO | Calculate the contingency fuel by using requirements according to the applicable operational requirements. | x | x | | | | |
| LO | State and explain the requirements for contingency fuel according to the applicable operational requirements. | | | x | x | x | |
| LO | Calculate the contingency fuel by using requirements according to the applicable operational requirements for IFR flights. | | | x | | | |
| LO | Calculate the contingency fuel by using requirements according to the applicable operational requirements for VFR flights in a hostile environment. | | | x | x | x | |
| LO | Calculate the contingency fuel by using requirements according to the applicable operational requirements for VFR flights in a non-hostile environment. | | | x | x | x | |
| | ***Alternate fuel*** | | | | | | |
| LO | Explain the reasons and regulations for having alternate fuel and name the segments of flight for which the fuel is relevant. | x | x | x | x | x | |
| LO | Calculate the alternate fuel in accordance with the applicable operational requirements and relevant data from the navigation plan and the Flight Manual. | x | x | | | | |
| LO | 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 | |
| | ***Final reserve fuel*** | | | | | | |
| LO | Explain the reasons and regulations for having final reserve fuel. | x | x | x | x | x | |

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| LO | Calculate the final reserve fuel for an aeroplane 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 Flight Manual. | x | x | | | | |
| LO | 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 | |
| LO | 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 | | | |
| | ***Additional fuel*** | | | | | | |
| LO | Explain the reasons and regulations for having additional fuel. | x | x | x | x | x | |
| LO | Calculate the additional fuel for an IFR flight without a destination alternate in accordance with the applicable operational requirements for an isolated aerodrome. | x | | | | | |
| LO | Calculate the additional fuel for a flight to an isolated heliport in accordance with the applicable operational requirements. | | | x | x | x | |
| **033 03 02 04** | **Extra fuel** | | | | | | |
| LO | Explain the reasons and regulations for having extra fuel in accordance with the applicable operational requirements. | x | x | | | | |
| LO | Explain the reasons and regulations for having extra fuel in accordance with the applicable operational requirements. | | | x | x | x | |
| LO | Calculate the possible extra fuel under given conditions. | x | x | x | x | x | |

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| **033 03 02 05** | **Calculation of total fuel and completion of the fuel section of the navigation plan (fuel log)** | | | | | | |
| LO | Calculate the total fuel required for a flight. | x | x | x | x | x | |
| LO | Complete the fuel log. | x | x | x | x | x | |
| **033 03 03 00** | **Specific fuel-calculation procedures** | | | | | | |
| **033 03 03 01** | **Decision-point procedure** | | | | | | |
| LO | Explain the reasons and regulations for the decision-point procedure as stated in the applicable operational requirements. | x | | | | | |
| LO | Calculate the contingency fuel and trip fuel required in accordance with the decision-point procedure. | x | | | | | |
| **033 03 03 02** | **Isolated-aerodrome procedure** | | | | | | |
| LO | Explain the basic procedures for an isolated aerodrome as stated in the applicable operational requirements. | x | | | | | |
| LO | Calculate the additional fuel for aeroplanes with reciprocating engines according to the isolated-aerodrome procedures. | x | | | | | |
| LO | Calculate the additional fuel for aeroplanes with turbine engines according to the isolated-aerodrome procedures. | x | | | | | |
| **033 03 03 03** | **Predetermined point procedure** | | | | | | |
| LO | Explain the basic idea of the predetermined-point procedure as stated in the applicable operational requirements. | x | | | | | |
| LO | Calculate the additional fuel for aeroplanes with reciprocating engines according to the predetermined-point | x | | | | | |

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| | procedure. | | | | | | |
| LO | Calculate the additional fuel for aeroplanes with turbine engines according to the predetermined-point procedure. | x | | | | | |
| **033 03 03 04** | **Fuel-tankering** | | | | | | |
| LO | Explain the basic idea of fuel-tankering procedures. | x | | | | | |
| LO | 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 | | | | | |
| LO | Calculate tankered fuel by using given appropriate graphs, tables and/or data. | x | | | | | |
| **033 03 03 05** | **Isolated-heliport procedure** | | | | | | |
| LO | Explain the basic idea of the isolated-heliport procedures as stated in the applicable operational requirements. | | | x | x | | |
| LO | Calculate the additional fuel according to the isolated-heliport procedures as stated in the applicable operational requirements for flying IFR. | | | x | | | |
| LO | 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 | | |
| **033 04 00 00** | **PRE-FLIGHT PREPARATION** | | | | | | |
| **033 04 01 00** | **NOTAM briefing** | | | | | | |
| **033 04 01 01** | **Ground facilities and services** | | | | | | |
| LO | Check that the ground facilities and services required for the planned flight are available and adequate. | x | x | x | x | x | x |

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| **033 04 01 02** | **Departure, destination and alternate aerodromes** | | | | | | |
| LO | Find and analyse the latest state at the departure, destination and alternate aerodromes, in particular for:<br>— opening hours;<br>— Work in Progress (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 |
| **033 04 01 03** | **Airway routings and airspace structure** | | | | | | |
| LO | 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 |
| **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.* | | | | | | |
| **033 04 02 02** | **Update of navigation plan using the latest meteorological information** | | | | | | |
| LO | Confirm the optimum altitude/FL from given wind, temperature and aircraft data. | x | x | x | x | x | x |
| LO | Confirm true altitudes from given atmospheric data to ensure that statutory minimum clearance is attained. | x | x | x | x | x | x |
| LO | Confirm magnetic headings and ground speeds. | x | x | x | x | x | x |

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| LO | Confirm the individual leg times and the total time en route. | x | x | x | x | x | x |
| LO | Confirm the total time en route for the trip to the destination. | x | x | x | x | x | x |
| LO | Confirm the total time from destination to the alternate airfield. | 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.* | | | | | | |
| **033 04 02 04** | **Update of performance data**<br>*Remark: This item is taught and examined in subject 032 for aeroplanes and subject 034 for helicopters.* | | | | | | |
| **033 04 02 05** | **Update of fuel log** | | | | | | |
| LO | Calculate the revised fuel data in accordance with the changed conditions. | x | x | x | x | x | x |
| **033 04 03 00** | **Point of Equal Time (PET) and Point of Safe Return (PSR)** | | | | | | |
| **033 04 03 01** | **Point of Equal Time (PET)** | | | | | | |
| LO | Define 'PET'. | x | | x | x | | |
| LO | Explain the basic idea of determination of PET. | x | | x | x | | |
| LO | Calculate the position of a PET and the ETA at the PET from given relevant data. | x | | x | x | | |
| **033 04 03 02** | **Point of Safe Return (PSR)** | | | | | | |
| LO | Define 'PSR'. | x | | x | x | | |
| LO | Explain the basic idea of determination of PSR. | x | | x | x | | |
| LO | 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 Flight Plan)** | | | | | | |
| **033 05 01 00** | **Individual Flight Plan** | | | | | | |

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| **033 05 01 01** | **Format of Flight Plan** | | | | | | |
| LO | State the reasons for a fixed format of an ICAO ATS Flight Plan (FPL). | x | x | x | x | x | x |
| LO | Determine the correct entries to complete an FPL plus decode and interpret the entries in a completed 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 |
| **033 05 01 02** | **Completion of an ATS Flight Plan (FPL)** | | | | | | |
| LO | Complete the FPL by using the information from the following:<br>— navigation plan;<br>— fuel plan;<br>— operator's records for basic aircraft information. | x | x | x | x | x | x |
| **033 05 02 00** | **Repetitive Flight Plan** | | | | | | |
| LO | Explain the difference between an Individual Flight Plan (FPL) and a Repetitive Flight Plan (RPL). | x | | x | x | | |
| LO | Explain the basic idea of an RPL and state the general requirements for its use. | x | | x | x | | |
| **033 05 03 00** | **Submission of an ATS Flight Plan (FPL)**<br>*Remark: This item is taught and examined in subject 010.* | | | | | | |

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| **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** | | | | | | |
| LO | Assess deviations from the planned course, headings (by maintaining desired courses) and times. | x | x | x | x | x | x |
| LO | State the reasons for possible deviations. | x | x | x | x | x | x |
| LO | Calculate the ground speed by using actual in-flight parameters. | x | x | x | x | x | x |
| LO | Calculate the expected leg times by using actual flight parameters. | x | x | x | x | x | x |
| **033 06 01 02** | **In-flight fuel management** | | | | | | |
| LO | 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 |
| LO | Assess deviations of actual fuel consumption from planned consumption. | x | x | x | x | x | x |
| LO | State the reasons for possible deviations. | x | x | x | x | x | x |
| LO | Calculate the fuel quantities used, fuel consumption and fuel remaining at navigation checkpoints /waypoints. | x | x | x | x | x | x |
| LO | Compare the actual with the planned fuel consumption by means of calculation or flight-progress chart. | x | x | x | x | x | x |
| LO | Assess the remaining range and endurance by means of calculation or flight-progress chart. | x | x | x | x | x | x |
| **033 06 01 03** | **Monitoring of primary flight parameters** | | | | | | |
| | Explain the methodology for monitoring | x | x | x | x | x | x |

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| | 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 particular pitch, thrust and speed). | | | | | | |
| **033 06 02 00** | **In-flight replanning in case of deviation from planned data** | | | | | | |
| LO | 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 | 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 | |
| LO | Explain why, 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 | |
| LO | Assess the revised destination/ alternate aerodrome landing mass from given latest data. | x | x | x | x | x | |