Learning Objectives 033 Flight Planning and Flight Monitoring

INTRODUCTION:

Preliminary general remark:

1. To fully appreciate and understand subject 033, the applicant will benefit from background knowledge in subjects 010, 020, 031, 032/034, 050, 060,and 080.
2. The Jeppesen Student Pilots' Training Route Manual (SPTRM), otherwise known as the Training Route Manual (TRM), contains planning data plus Aerodrome and Approach charts that may be used in training courses and, subject to National Aviation Authority (NAA) regulations, for reference during JAR-FCL examinations. Where NAA regulations do not permit the use of a SPTRM during examinations, appropriate Annexes will be provided to support the relevant questions.
3. Specimen data manuals, CAP 697 for Aeroplanes and CAP 758 for Helicopters, may be used in training courses and, subject to National Aviation Authority (NAA) regulations, for reference during JAR-FCL examinations. Where NAA regulations do not permit the use of these manuals during examinations, appropriate Annexes will be provided to support the relevant questions.
4. Unofficial definitions that are used in this subject are explained in the relevant CAP manual. For mass definitions refer to syllabus for subject 031 Mass and Balance
5. The following reference documents are specifically mentioned in these Learning Objective (LOs) and should be used for reference as required:
   EU-OPS 1
   JAR-OPS 3
6. Some numerical data eg speeds, altitudes/levels and masses, in examination questions may not be representative for Helicopter operations but the data is satisfactory for the calculations required.
7. Where a LO refers to a definition e.g. 'Define the following terms' or 'Define and understand…', candidates are also expected to be able to recognise a given definition.

Syllabus reference	Syllabus details and associated Learning Objectives
033 00 00 00	**FLIGHT PLANNING AND FLIGHT MONITORING**
033 02 00 00	**FLIGHT PLANNING FOR IFR FLIGHTS** *Remark – Using Training Route Manual IFR charts or CQB 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: - Altitudes and Flight levels - Standard routes - ATC restrictions - Shortest distance - Obstacles - Any other relevant data
033 02 01 02	**Courses and distances from en-route charts**
LO	Determine courses and distances
LO	Determine bearings and distances of waypoints from radio navigation aids
033 02 01 03	**Minimum Altitudes**
LO	Define the following minimum altitudes: - Minimum Enroute Altitude (MEA) - Minimum Obstacle Clearance Altitude (MOCA) - Minimum Off Route Altitude (MORA) - Grid Minimum Off-Route Altitude (Grid MORA) - Maximum Authorized Altitude (MAA) - Minimum Crossing Altitude (MCA) - Minimum Holding Altitude (MHA)
LO	Extract the following minimum altitudes from the chart(s): - Minimum En-route Altitude (MEA) - Minimum Obstacle Clearance Altitude (MOCA) - Minimum Off Route Altitude (MORA) - Grid Minimum Off-Route Altitude (Grid MORA) - Maximum Authorized Altitude (MAA) - Minimum Crossing Altitude (MCA) - Minimum Holding Altitude (MHA)
LO	Define, state and name effect on practice : - Absolute Ceiling - Service Ceiling - Aerodynamic Ceiling - Optimum Altitude - Maximum Altitude - Maximum operating Altitude
033 02 01 04	**Standard Instrument Departures (SIDs) and Standard Arrival Routes (STARs)**
LO	Explain the reasons for studying SID and STAR charts
LO	State the reasons why the SID and STAR charts show procedures only in a pictorial presentation style which is not to scale
LO	Interpret all data and information represented on SID and STAR charts, particularly:

Syllabus reference	Syllabus details and associated Learning Objectives
	- Routings - Distances - Courses - Radials - Altitudes/Levels - Frequencies - Restrictions
LO	Identify SIDs and STARs which might be relevant to a planned flight
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
LO	Select instrument approach procedures appropriate for departure, destination and alternate airfields
LO	Interpret all procedures, data and information represented on Instrument Approach Charts, particularly: - Courses and Radials - Distances - Altitudes/Levels/Heights - Restrictions - Obstructions - Frequencies - Speeds and times - Decision Altitudes/Heights (DA/H) and Minimum Descent Altitudes/Heights (MDA/H) - Visibility and runway visual ranges (RVR) - Approach light systems
033 02 01 06	**Communications and Radio Navigation planning data**
LO	Find the frequency and/or identifiers of radio navigation aids
033 02 01 07	**Completion of navigation plan**
LO	Complete the navigation plan with the courses, distances and frequencies taken from charts
LO	Find Standard Instrument Departure and Arrival Routes to be flown and/or to be expected
LO	Determine the position of Top of Climb (TOC) and Top of Descent (TOD) given appropriate data
LO	Determine variation and calculate magnetic/true courses
LO	Calculate True Air Speed (TAS) given aircraft performance data, altitude and outside air temperature (OAT)
LO	Calculate Wind Correction Angles (WCA) / Drift and Ground Speeds (GS)
LO	Determine all relevant Altitudes/Levels particularly MEA, MOCA, MORA , MAA, MCA, MRA and MSA
LO	Calculate individual and accumulated times for each leg to destination and alternate airfields
033 03 00 00	**FUEL PLANNING**
033 03 01 00	**General**
LO	Convert between volume, mass and density given in different units which are commonly used in aviation
LO	Determine relevant data from flight manual, such as fuel capacity, fuel flow/consumption at different power/thrust settings, altitudes and atmospheric conditions

Syllabus reference	Syllabus details and associated Learning Objectives
LO	Calculate attainable flight time/range given fuel flow/consumption and available amount of fuel
LO	Calculate the required fuel given fuel flow/consumption and required time/range to be flown
LO	Calculate the required fuel for a VFR flight given expected meteorological conditions and expected delays under defined conditions
LO	Calculate the required fuel for an IFR flight given expected meteorological conditions and expected delays under defined conditions.
033 03 02 00	**Pre-flight fuel planning for commercial flights**
033 03 02 01	**Taxi fuel**
LO	Determine the fuel required for engine start and taxi by consulting the fuel usage tables and/or graphs from the flight manual taking into account all relevant conditions
033 03 02 02	**Trip fuel**
LO	Define trip fuel and name the segments of flight for which the trip fuel is relevant
LO	Determine the trip fuel for the flight using data from the navigation plan and fuel tables and/or graphs from the flight manual
033 03 02 03	**Reserve fuel and its components**
	Contingency fuel
LO	Explain the reasons for having contingency fuel
LO	State and explain the requirements for contingency fuel as detailed in EU-OPS 1.255
LO	Calculate contingency fuel using requirements as detailed in EU-OPS 1.255
LO	State and explain the requirements for contingency fuel as detailed in JAR-OPS 3.255
LO	Calculate the contingency fuel using requirements as detailed in JAR-OPS 3.255 for IFR flights
LO	Calculate the contingency fuel using requirements as detailed in JAR-OPS 3.255 for VFR flights in a hostile environment
LO	Calculate the contingency fuel using requirements as detailed in JAR-OPS 3.255 for VFR flights in a non-hostile environment
	Alternate fuel
LO	Explain the reasons and regulations for having alternate fuel and name the segments of flight for which the fuel is relevant
LO	Calculate the alternate fuel in accordance with EU-OPS 1.255 and relevant data from the navigation plan and the Flight Manual
LO	Calculate the alternate fuel in accordance with JAR-OPS 3.255 and relevant data from the navigation plan and the Flight Manual
	Final reserve fuel
LO	Explain the reasons and regulations for having final reserve fuel
LO	Calculate the final reserve fuel for an aeroplane with reciprocating engines and for an aeroplane with turbine power units in accordance with EU-OPS 1.255 requirements and using relevant data from the Flight Manual
LO	Calculate the final reserve fuel for a VFR flight (by day with reference to visual landmarks) in accordance with JAR-OPS 3.255 requirements and using relevant data from the Flight Manual
LO	Calculate the final reserve fuel for a IFR flight in accordance with JAR-OPS 3.255 requirements and using relevant data from the Flight Manual
	Additional fuel
LO	Explain the reasons and regulations for having additional fuel

Syllabus reference	Syllabus details and associated Learning Objectives
LO	Calculate the additional fuel for an IFR flight without a destination alternate in accordance with EU-OPS 1.255 and 1.295 for an isolated aerodrome
LO	Calculate the additional fuel for a flight to an isolated heliport in accordance with AMC OPS 3.255
033 03 02 04	**Extra fuel**
LO	Explain the reasons and regulations for having extra fuel in accordance with EU-OPS 1.255
LO	Explain the reasons and regulations for having extra fuel in accordance with JAR-OPS 3.255.
LO	Calculate the possible extra fuel under given conditions
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
LO	Complete the fuel log
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 AMC OPS 1.255
LO	Calculate the contingency fuel and trip fuel required in accordance with the decision point procedure
033 03 03 02	**Isolated aerodrome procedure**
LO	Explain the basic procedures for an isolated aerodrome as stated in AMC OPS 1.255
LO	Calculate additional fuel for aeroplanes with reciprocating engines according to the isolated aerodrome procedures
LO	Calculate additional fuel for aeroplanes with turbine engines according to isolated aerodrome procedures
033 03 03 03	**Pre-determined point procedure**
LO	Explain the basic idea of the pre-determined point procedure as stated in AMC OPS 1.255
LO	Calculate additional fuel for aeroplanes with reciprocating engines according to pre-determined point procedure
LO	Calculate additional fuel for aeroplanes with turbine engines according to pre-determined point procedure
033 03 03 04	**Fuel tankering**
LO	Explain the basic idea of fuel tankering procedures
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)
LO	Calculate tankered fuel using given appropriate graphs, tables and/or data .
033 04 00 00	**PRE-FLIGHT PREPARATION**
033 04 01 00	**NOTAM briefing**
033 04 01 01	**Ground facilities and services**
LO	Check that ground facilities and services required for the planned flight are available and adequate
033 04 01 02	**Departure, destination and alternate aerodromes**

Syllabus reference	Syllabus details and associated Learning Objectives
LO	Find and analyse the latest state at the departure, destination and alternate aerodromes, in particular for: - Opening hours - Work in Progress (WIP) - Special procedures due to Work in Progress (WIP) - Obstructions - Changes of frequencies for communications, navigation aids and facilities
033 04 01 03	**Airway routings and airspace structure**
LO	Find and analyse the latest en-route state for: - Airway(s) or Route(s) - Restricted, Dangerous and Prohibited areas - Changes of frequencies for communications, navigation aids and facilities
033 04 02 00	**Meteorological briefing**
033 04 02 01	**Extraction and analysis of relevant data from meteorological documents** *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 given wind, temperature and aircraft data
LO	Confirm true altitudes to ensure that statutory minimum clearance is attained given atmospheric data
LO	Confirm magnetic headings and ground speeds
LO	Confirm the individual leg times and the total time en route
LO	Confirm the total time en route for the trip to the destination
LO	Confirm the total time from destination to the alternate airfield
033 04 02 03	**Update of Mass and Balance** *Remark - this item is taught and examined in subjects 031*
LO	Define and explain the meaning of centre of gravity: The centre of gravity is the imaginary point where all the aircraft mass is considered to be concentrated
LO	Compare and name effect on practice of the relationship between CG position and stability/controllability of aircraft
LO	State the effects of CG position on performance parameters (speeds, altitude, endurance and range) - Forward CG increases static longitudinal stability, decreases controllability, stall speed increases - Aft CG decreases static longitudinal stability, increases controllability, stall speed decreases
LO	Name the consideration of load compatibility (compatibility chart)

Syllabus reference	Syllabus details and associated Learning Objectives
LO	Define, compare & name effect on practice of the following structural limitations: - Empty Mass - Basic Mass - Dry Operating Mass - Operating Mass - Gross Mass - Take off Mass - Landing Mass - Zero Fuel Mass - Payload - MTOM Structural limit to leave the aircraft the ability to take-off on a given runway length - MLAM Structural limit to protect the gears - MZFM Structural limit that indicated the maximum fuselage weight in comparison to the wings and the lift - Performance limited take-off mass (PTOM) TOM limited by environmental issues like weather, runway length, slope, QNH, temperature - Performance limited landing mass (PLAM) LAM limited by environmental issues - Maximum payload - Maximum extra Fuel - Unusable fuel (ballast, remaining in centre tank etc.) - Allowed mass for take-off (lowest of a, b or c)
LO	Find load limits in the OM-B
LO	Fill out and be able to read and interpret a load and trim sheet
033 04 02 04	**Update of Performance data** *Remark - this item is taught and examined in subject 032 for Aeroplanes*
LO	Calculate and explain the influence of speeds like V_{MCG} or Cruise Speeds for flight planning
LO	Calculate and explain the influence of Distances and Obstacles for flight planning
LO	Calculate and explain the influence of Special Operation: - One engine out. Flight procedures after engine failure , drift down procedure, escape routes, application of MCT - Gear down Operations
033 04 02 05	**Update of fuel log**
LO	Calculate revised fuel data in accordance with changed conditions
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
LO	Explain the basic idea of determination of PET
LO	Calculate the position of a PET and the ETA at the PET given relevant data
033 04 03 02	**Point of Safe Return (PSR)**
LO	Define PSR

Syllabus reference	Syllabus details and associated Learning Objectives
LO	Explain the basic idea of determination of PSR
LO	Calculate the position of a PSR and the ETA at the PSR given relevant data
033 05 00 00	**ICAO FLIGHT PLAN (ATS Flight Plan)**
033 05 01 00	**Individual Flight Plan**
033 05 01 01	**Format of Flight Plan**
LO	State the reasons for a fixed format of an ICAO ATS Flight Plan (FPL)
LO	Determine the correct entries to complete an FPL plus decode and interpret the entries in a completed FPL, particularly for the following: - Aircraft identification (Item 7) - Flight rules and type of flight (Item 8) - Number and type of aircraft and wake turbulence category (Item 9) - Equipment (Item 10) - Departure aerodrome and time (Item 13) - Route (Item 15) - Destination aerodrome, total estimated elapsed time and Alternate aerodrome (Item 16) - Other information (Item 18) - Supplementary Information (Item 19)
033 05 01 02	**Completion of an ATS Flight Plan (FPL)**
LO	Complete the Flight Plan using information from the following: - Navigation plan - Fuel plan - Operator's records for basic aircraft information
033 05 02 00	**Repetitive Flight Plan**
LO	Explain the difference between an Individual Flight Plan (FPL) and a Repetitive Flight Plan (RPL)
LO	Explain the basic idea of a Repetitive Flight Plan and state the general requirements for the use of a Repetitive Flight Plan (RPL)
033 05 03 00	**Submission of an ATS Flight Plan (FPL)**
LO	Explain the requirements for the submission of an ATS Flight Plan
LO	Explain the actions to be taken in case of Flight Plan changes
LO	State the actions to be taken in case of inadvertent changes to Track, TAS and time estimate affecting the current Flight Plan
LO	Explain the procedures for closing a Flight Plan
033 06 00 00	**FLIGHT MONITORING AND IN-FLIGHT RE-PLANNING**
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.
LO	State the reasons for possible deviations
LO	Calculate the ground speed using actual in-flight parameters
LO	Calculate expected leg times using actual flight parameters
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
LO	Assess deviations of actual fuel consumption from planned consumption
LO	State reasons for possible deviations
033 06 02 00	**In-flight re-planning in case of deviation from planned data**

Syllabus reference	Syllabus details and associated Learning Objectives
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.
LO	Perform in-flight updates, if necessary, based on results of in-flight monitoring, specifically by: - Selecting a new destination/alternate aerodrome - Adjusting flight parameters and power settings
LO	Explain why, in the case of an in-flight update, the commander has to check the following: - The suitability of the new destination and/or alternate aerodrome - Meteorological conditions on revised routing and at revised destination and/or alternate aerodrome - The aircraft must be able to land with the prescribed final reserve fuel
LO	Assess the revised destination/alternate aerodrome landing mass given the latest data.