

JAA Administrative & Guidance Material
Section Five: Licensing, Part Two: Procedures

CHAPTER 17: DETAILED THEORETICAL KNOWLEDGE SYLLABUS AND LEARNING OBJECTIVES

Subject – 033 – Flight Planning and Flight Monitoring

See Appendix 1 to JAR-FCL 1.470 and JAR-FCL 2.470

INTRODUCTION

Preliminary general remarks:

- 1 To fully appreciate and understand subject 033, the applicant will benefit from background knowledge in subjects 010, 020, 031, 032/034, 050, 060, 070 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.
- 5 The following reference documents are specifically mentioned in these Learning Objectives (LOs) and should be used for reference as required:
JAR-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 eg 'Define the following terms' or 'Define and understand...', candidates are also expected to be able to recognise a given definition.

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR
		ATPL	CPL	ATPL/IR	ATPL	
033 00 00 00	FLIGHT PLANNING AND FLIGHT MONITORING					
033 01 00 00	FLIGHT PLANNING FOR VFR FLIGHTS <i>Remark – Using Training Route Manual VFR charts or CQB Annexes</i>					
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: - Classification of airspace - Controlled airspace - Uncontrolled airspace - Restricted areas - Minimum safe altitudes - VFR Semi-circular rules - Conspicuous points - 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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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR
		ATPL	CPL	ATPL/IR	ATPL	
LO	Find the highest obstacle within a given distance either side of the course	X	X	X	X	X
LO	Find the following data from the chart and transfer to the navigation plan: - Waypoints and/or turning points - Distances - 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: - Aerodrome regulations and opening hours - Terrain high points and man made structures - Altitudes - Courses and radials - Helipads (for helicopter only) - Any other relevant information	X	X	X	X	X
033 01 01 04	Communications and Radio Navigation planning data					
LO	Find communication frequencies and call signs for the following: - control agencies and service facilities - flight information services - weather information stations - Automatic Terminal Information Service	X	X	X	X	X
LO	Find the frequency and/or identifier of appropriate radio navigation aids	X	X	X	X	X
033 01 01 05	Completion of navigation plan					
LO	Complete the navigation plan with the courses and distances as taken from charts	X	X	X	X	X
LO	Find departure and arrival routes	X	X	X	X	X

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR	
		ATPL	CPL	ATPL/IR	ATPL		CPL
LO	Determine the position of the top of climb (TOC) and top of descend (TOD) given appropriate data	X	X	X	X	X	
LO	Determine variation and calculate magnetic courses	X	X	X	X	X	
LO	Calculate the True Air Speed (TAS) given aircraft performance data, altitude and outside air temperature (OAT)	X	X	X	X	X	
LO	Calculate Wind Correction Angles (WCA) / 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 <i>Remark – Using Training Route Manual IFR charts or CQB Annexes</i>						
033 02 01 00	IFR Navigation plan						
033 02 01 01	Airways and routes						
LO	Select the preferred airway(s) or route(s) considering: <ul style="list-style-type: none"> - Altitudes and Flight levels - Standard routes - ATC restrictions - Shortest distance - Obstacles - 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
033 02 01 03	Minimum Altitudes						
LO	Define the following minimum altitudes: <ul style="list-style-type: none"> - Minimum En-route Altitude (MEA) - Minimum Obstacle Clearance Altitude (MOCA) 	X		X			X

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR	
		ATPL	CPL	ATPL/IR	ATPL		CPL
	<ul style="list-style-type: none"> - 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): <ul style="list-style-type: none"> - 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) 	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 the 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: <ul style="list-style-type: none"> - Routings - Distances - Courses - Radials - Altitudes/Levels - Frequencies - Restrictions 	x		x			x
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

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR	
		ATPL	CPL	ATPL/IR	ATPL		CPL
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: - Courses and Radials - Distances - Altitudes/Levels/Heights - Restrictions - Obstructions - Frequencies - Speeds and times - Decision Altitudes/Heights (DA/H) and Minimum Descent Altitudes/Heights (MDA/H) - Visibility and runway visual ranges (RVR) - Approach light systems	X		X			X
033 02 01 06	Communications and Radio Navigation planning data						
LO	Find communication frequencies and call signs for the following: - control agencies and service facilities - flight information services (FIS) - weather information stations - Automatic Terminal Information Service (ATIS)	X		X			X
LO	Find the frequency and/or identifiers of radio navigation aids	X		X			X
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 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) given appropriate data	X		X			X
LO	Determine variation and calculate magnetic/true courses	X		X			X

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR	
		ATPL	CPL	ATPL/IR	ATPL		CPL
LO	Calculate True Air Speed (TAS) 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 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 between 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 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 attainable flight time/range given fuel flow/consumption and available amount of fuel	X	X	X	X	X	X
LO	Calculate the required fuel 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 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 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	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	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	

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR
		ATPL	CPL	ATPL/IR	ATPL	CPL	
LO	Determine the trip fuel for the flight 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 as detailed in JAR-OPS 1.255	X	X				
LO	Calculate contingency fuel using requirements as detailed in JAR-OPS 1.255	X	X				
LO	State and explain the requirements for contingency fuel as detailed in JAR-OPS 3.255			X	X	X	
LO	Calculate the contingency fuel using requirements as detailed in JAR-OPS 3.255 for IFR flights			X			
LO	Calculate the contingency fuel using requirements as detailed in JAR-OPS 3.255 for VFR flights in a hostile environment			X	X	X	
LO	Calculate the contingency fuel using requirements as detailed in JAR-OPS 3.255 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 JAR-OPS 1.255 and relevant data from the navigation plan and the Flight Manual	X	X				
LO	Calculate the alternate fuel in accordance with JAR-OPS 3.255 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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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR
		ATPL	CPL	ATPL/IR	ATPL	CPL	
LO	Calculate the final reserve fuel for an aeroplane with reciprocating engines and for an aeroplane with turbine power units in accordance with JAR-OPS 1.255 requirements and 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 JAR-OPS 3.255 requirements and using relevant data from the Flight Manual			X	X	X	
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			X	X	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 JAR-OPS 1.255 and 1.295 for an isolated aerodrome	X					
LO	Calculate the additional fuel for a flight to an isolated heliport in accordance with AMC OPS 3.255			X	X	X	
033 03 02 04	Extra fuel						
LO	Explain the reasons and regulations for having extra fuel in accordance with JAR-OPS 1.255	X	X				
LO	Explain the reasons and regulations for having extra fuel in accordance with JAR-OPS 3.255.			X	X	X	
LO	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)						
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						

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR
		ATPL	CPL	ATPL/IR	ATPL	
LO	Explain the reasons and regulations for the decision point procedure as stated in AMC OPS 1.255	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 AMC OPS 1.255	x				
LO	Calculate additional fuel for aeroplanes with reciprocating engines according to the isolated aerodrome procedures	x				
LO	Calculate additional fuel for aeroplanes with turbine engines according to isolated aerodrome procedures	x				
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	x				
LO	Calculate additional fuel for aeroplanes with reciprocating engines according to pre-determined point procedure	x				
LO	Calculate additional fuel for aeroplanes with turbine engines according to pre-determined 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 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 AMC OPS 3.255			x	x	
LO	Calculate additional fuel according to isolated heliport procedure as stated in AMC OPS 3.255			x	x	

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR
		ATPL	CPL	ATPL/IR	ATPL	
	flying IFR					
LO	Calculate additional fuel according to isolated heliport procedure as stated in AMC OPS 3.255 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 ground facilities and services required for the planned flight are available and adequate	X	X	X	X	X
033 04 01 02	Departure, destination and alternate aerodromes					
LO	Find and analyse the latest state at the departure, destination and alternate aerodromes, in particular for: - Opening hours - Work in Progress (WIP) - Special procedures due to Work in Progress (WIP) - Obstructions - Changes of frequencies for communications, navigation aids and facilities	X	X	X	X	X
033 04 01 03	Airway routings and airspace structure					
LO	Find and analyse the latest en-route state for: - Airway(s) or Route(s) - Restricted, Dangerous and Prohibited areas - Changes of frequencies for communications, navigation aids and facilities	X	X	X	X	X
033 04 02 00	Meteorological briefing					
033 04 02 01	Extraction and analysis of relevant data from meteorological documents <i>Remark - this item is taught and examined in subject 050)</i>					
033 04 02 02	Update of navigation plan using the latest meteorological information:					

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR	
		ATPL	CPL	ATPL/IR	ATPL		CPL
LO	Confirm the optimum altitude/FL given wind, temperature and aircraft data	X	X	X	X	X	X
LO	Confirm true altitudes to ensure that statutory minimum clearance is attained given atmospheric data	X	X	X	X	X	X
LO	Confirm magnetic headings and ground speeds	X	X	X	X	X	X
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 <i>Remark - this item is taught and examined in subjects 031</i>						
033 04 02 04	Update of Performance data <i>Remark - this item is taught and examined in subject 032 for Aeroplanes and subject 034 for Helicopters</i>						
033 04 02 05	Update of fuel log						
LO	Calculate revised fuel data in accordance with 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 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		

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR
		ATPL	CPL	ATPL/IR	ATPL	
LO	Calculate the position of a PSR and the ETA at the PSR given relevant data	X		X	X	
033 05 00 00	ICAO FLIGHT PLAN (ATS Flight Plan)					
033 05 01 00	Individual Flight Plan					
033 05 01 01	Format of Flight Plan					
LO	State the reasons for a fixed format of an ICAO ATS Flight Plan (FPL)	X	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: - Aircraft identification (Item 7) - Flight rules and type of flight (Item 8) - Number and type of aircraft and wake turbulence category (Item 9) - Equipment (Item 10) - Departure aerodrome and time (Item 13) - Route (Item 15) - Destination aerodrome, total estimated elapsed time and Alternate aerodrome (Item 16) - Other information (Item 18) - Supplementary Information (Item 19)	X	X	X	X	X
033 05 01 02	Completion of an ATS Flight Plan (FPL)					
LO	Complete the Flight Plan using information from the following: - Navigation plan - Fuel plan - Operator's records for basic aircraft information	X	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 a Repetitive Flight Plan and state the general requirements for the use of a Repetitive Flight Plan (RPL)	X		X	X	
033 05 03 00	Submission of an ATS Flight Plan (FPL)					

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR
		ATPL	CPL	ATPL/IR	ATPL	
	<i>Remark – this item is taught and examined in subject 010</i>					
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.	X	X	X	X	X
LO	State the reasons for possible deviations	X	X	X	X	X
LO	Calculate the ground speed using actual in-flight parameters	X	X	X	X	X
LO	Calculate expected leg times using actual flight parameters	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
LO	Assess deviations of actual fuel consumption from planned consumption	X	X	X	X	X
LO	State reasons for possible deviations	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
LO	Compare the actual and the planned fuel consumption by means of calculation or flight progress chart	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
033 06 02 00	In-flight re-planning 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

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Syllabus reference	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter		IR	
		ATPL	CPL	ATPL/IR	ATPL		CPL
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	X	X	X	X	X	
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	X	X	X	X	X	
LO	Assess the revised destination/alternate aerodrome landing mass given the latest data.	X	X	X	X	X	