European Aviation Safety Agency

Notice of Proposed Amendment 2016-03(F)

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 040 — Human performance and limitations

Area 100 KSA — Knowledge, skills and attitudes

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 040 'Human performance and limitations'

This Subject has been extensively edited, with many of its parts proposed for deletion. As a result, the syllabus has been restructured.

Description of the atmosphere with Boyle's, Dalton's, Henry's and General Gas Law was too detailed. It has been adjusted to be relevant for pilots.

Irrelevant details about pulse rates of the heart and respiratory rates and processes have been adjusted to practical use for pilots.

Effects of sun storms on harmful radiations of the sun light have been considered as having no practical use and have been proposed for deletion.

Central, peripheral and autonomic nervous systems have been limited to the main parts of the nervous system.

The paragraph about personal hygiene has been deleted. Fatigue risk management has been added as a new Learning Objective (LO).

SUBJECT 040 — HUMAN PERFORMANCE AND LIMITATIONS

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
			ATPL	CPL	ATPL /IR	ATPL	CPL			
040 00 00 00		**HUMAN PERFORMANCE**								Deleted LOs are knowledge that is of no practical use for pilots
040 01 00 00		**HUMAN FACTORS: BASIC CONCEPTS**								
040 01 01 00		**Human factors in aviation**								
040 01 01 01		***Becoming a competent pilot***								
(01)		State that competency is based on knowledge, skills and abilities of the individual pilot and list the ICAO eight core competencies.	X	X	X	X	X	X		Clarity
(02)		Outline the factors in training that will ensure the future competency of the individual pilot.	X	X	X	X	X	X		
040 01 02 00		**Accident statistics**								
(01)		Give an estimate of the accident rate in commercial aviation in comparison to other means of transport.	X	X	X	X	X	X		
(02)		State in general terms the percentage of aircraft accidents which are caused by human factors (flight crew or other personnel).	X	X	X	X	X	X		Clarity
(03)		Summarise the accident trend in modern aviation.	X	X	X	X	X	X		
(04)		Identify the role of accident investigation and the	X	X	X	X	X	X		Clarity

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			ATPL	CPL	ATPL /IR	ATPL	CPL			
		statistics produced by the investigations in developing a strategy for future improvements to flight safety.								
040 01 03 00		**Flight safety concepts**								
(01)		Explain the three components of the ~~T~~threat and ~~E~~error m~~M~~anagement (TEM) model.	X	X	X	X	X	X	X	
(02)		Explain and give examples of latent threats.	X	X	X	X	X	X	X	
(03)		Explain and give examples of environmental threats.	X	X	X	X	X	X	X	
(04)		Explain and give examples of organisational threats.	X	X	X	X	X	X	X	
(05)		Explain and give a definition of 'error' according to the TEM model of ICAO ~~Annex 1~~ Doc 9683 (Part II, Chapter 2).	X	X	X	X	X	X	X	
(06)		Give examples of different countermeasures which may be used in order to manage threats, errors and undesired aircraft states.	X	X	X	X	X	X	X	
(07)		Explain and give examples of procedural error.	X	X	X	X	X	X	X	
(08)		Explain and give examples of 'undesired aircraft states'.	X	X	X	X	X	X		
(09)		Describe and compare the elements of the SHELL model.	X	X	X	X	X	X		
(10)		Summarise the relevance of the SHELL model to the work in the cockpit.	X	X	X	X	X	X		

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(11)		Analyse the interaction between the various components of the SHELL model.	X	X	X	X	X	X		
(12)		~~Explain how the interaction between individual crew members can affect flight safety~~. Identify and explain examples of liveware and liveware (L-L) interactions and their effects on flight safety.	X	X	X	X	X	X		Clarity
~~LO (13)~~		~~Identify and explain the interaction between flight crew and management as a factor in flight safety.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
040 01 04 00		**Safety culture**								
(01)		Distinguish between 'open cultures' and 'closed cultures'.	X	X	X	X	X	X	X	
(02)		Illustrate how safety culture is reflected in national culture.	X	X	X	X	X	X	X	
(03)		Question the established expression 'safety first' in a commercial entity.	X	X	X	X	X	X		
(04)		Explain James Reason's 'Swiss Cheese Model'.	X	X	X	X	X	X	X	
(05)		State the important factors that promote a good safety culture.	X	X	X	X	X	X	X	
(06)		Distinguish between 'just culture' and 'non-punitive culture'.	X	X	X	X	X	X	X	

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(07)		Name the five components which form safety culture (according to James Reason: informed culture, reporting culture, learning culture, just culture, flexible culture).	X	X	X	X	X	X	X	Clarity
040 02 01 00		**Basics of flight physiology**								
040 02 01 01		***The atmosphere***								
~~LO (01)~~		~~State the units used in measuring total and partial pressures of the gases in the atmosphere.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		Covered in 050 and 022
~~LO (02)~~		~~State in terms of % and mm Hg the values of oxygen, nitrogen and other gases present in the atmosphere.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(03)		State that the volume percentage of the gases in ambient air will remain constant for all altitudes at which conventional aircraft operate.	X	X	X	X	X	X		
~~LO (04)~~		~~State the physiological significance of the following laws:~~ ~~— Boyle's Law;~~ ~~— Dalton's Law;~~ ~~— Henry's Laws;~~ ~~— the General Gas Law.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
~~LO (05)~~		~~State the ICAO standard temperature at Mean Sea Level and the Standard Temperature Lapse Rate.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		

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(06)		State at what approximate altitudes in the standard atmosphere the atmospheric pressure will be ¼, ½ and ¾ of mean sea level (MSL) pressure.	X	X	X	X	X	X		
(07)		State the effects of increasing altitude on the overall pressure and partial pressures of the various gases in the atmosphere.	X	X	X	X	X	X		
~~LO (08)~~		~~Explain the differences in gas expansion between alveolar and ambient air when climbing.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
~~LO (09)~~		~~State the condition required for human beings to be able to survive at any given altitude.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
~~LO (10)~~		~~State and explain the importance of partial pressure.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
040 02 01 02		***Respiratory and circulatory system***								
(01)		List the main components of the respiratory system and their function.	X	X	X	X	X	X		
(02)		Identify the different volumes of air in the lungs and state the normal respiratory rate.	X	X	X	X	X	X		
(03)		State how oxygen and carbon dioxide are transported throughout the body.	X	X	X	X	X	X		
(04)		Explain the process by which oxygen is transferred to the tissues and carbon dioxide is eliminated from the body and the oxygen requirement of tissues.	X	X	X	X	X	X		

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(05)		Explain the role of carbon dioxide in the control and regulation of respiration.	X	X	X	X	X	X		
(06)		Describe the basic processes of external respiration and internal respiration.	X	X	X	X	X	X		
(07)		List the factors determining pulse rate.	X	X	X	X	X	X		
(08)		Name the major components of the circulatory system and describe their function.	X	X	X	X	X	X		
(09)		State the values for a normal pulse rate and the average cardiac output (heart rate × stroke volume) of an adult at rest.	X	X	X	X	X	X		
(10)		Name the four chambers of the heart and state the function of the individual chambers.	X	X	X	X	X	X		
(11)		Differentiate between arteries, veins and capillaries in their structure and function.	X	X	X	X	X	X		
(12)		State the functions of the coronary arteries and veins.	X	X	X	X	X	X		
(13)		Define ‘systolic’ and ‘diastolic’ blood pressure.	X	X	X	X	X	X		
(14)		State the normal blood pressure ranges and units of measurement.	X	X	X	X	X	X		
(15)		State that in an average pilot blood pressure will rise slightly with age as the arteries lose their elasticity.	X	X	X	X	X	X		

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
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(16)		List the main constituents of the blood and describe their functions.	X	X	X	X	X	X		
(17)		Stress the function of haemoglobin in the circulatory system.	X	X	X	X	X	X		
(18)		Define 'anaemia' and state its common causes.	X	X	X	X	X	X		
(19)		Indicate the effect of increasing altitude on haemoglobin oxygen saturation.	X	X	X	X	X	X		
		Hypertension and hypotension								
(20)		Define 'hypertension' and 'hypotension'.	X	X	X	X	X	X		
(21)		List the effects that high and low blood pressure will have on some normal functions of the human body.	X	X	X	X	X	X		
(22)		State that both hypotension and hypertension may disqualify the pilot from obtaining a medical clearance to fly.	X	X	X	X	X	X		
(23)		List the factors which can lead to hypertension in an individual.	X	X	X	X	X	X		
(24)		State the corrective actions that may be taken to reduce high blood pressure.	X	X	X	X	X	X		
(25)		Stress that hypertension is the major factor of strokes in the general population.	X	X	X	X	X	X		

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		Coronary artery disease								
(26)		Differentiate between 'angina' and 'heart attack'.	X	X	X	X	X	X		
(27)		Explain the major risk factors for coronary disease.	X	X	X	X	X	X		
(28)		State the role played by physical exercise in reducing the chances of developing coronary disease.	X	X	X	X	X	X		
		Hypoxia								
(29)		Define the two major forms of hypoxia (hypoxic and anaemic), and the common causes of both.	X	X	X	X	X	X		
(30)		State the symptoms of hypoxia.	X	X	X	X	X	X		
~~LO (31)~~		~~State why living tissues require oxygen.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(32)		State that healthy people are able to compensate for altitudes up to approximately 10 000–12 000 ft.	X	X	X	X	X	X		
(33)		Name the three physiological thresholds and allocate the corresponding altitudes for each of them. Reaction threshold (7 000 ft), disturbance threshold (10–12 000 ft), and critical threshold (22 000 ft).	X	X	X	X	X	X		Clarity
(34)		State the altitude at which short-term memory begins to be affected by hypoxia.	X	X	X	X	X	X		
(35)		Define the terms 'time of useful consciousness' (TUC) and 'effective performance time' (EPT).	X	X	X	X	X	X		Clarity

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
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(36)		State that TUC varies between individuals, but the approximate values for a person seated (at rest) are: 20 000 ft 30 min 30 000 ft 1–2 min 35 000 ft 30–90 sec40 000 ft ~~a)~~ 15–20 sec	X	X	X	X	X	X		
(37)		Explain the dangers of flying above 10 000 ft without using additional oxygen or being in a pressurised cabin.	X	X	X	X	X	X		
(38)		List the factors determining the severity of hypoxia.	X	X	X	X	X	X		
(39)		~~State the precautions to be taken when giving blood~~. State factors which can influence the risk of hypoxia (e.g. blood donation, menstruation, smoking).	X	X	X	X	X	X		Clarity
(40)		State the equivalent altitudes when breathing ambient air and 100 % oxygen for MSL and at approximately 10 000, 30 000 and 40 000 ft.	X	X	X	X	X	X		
		Hyperventilation								
(41)		Describe the role of carbon dioxide in hyperventilation.	X	X	X	X	X	X		
(42)		Define the term ‘hyperventilation’.	X	X	X	X	X	X		
(43)		List the factors causing hyperventilation.	X	X	X	X	X	X		
(44)		State that hyperventilation may be caused by psychological or physiological reasons.	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			
(45)		List the signs and symptoms of hyperventilation.	X	X	X	X	X	X		
~~LO (46)~~			~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
~~LO (47)~~		~~List the measures which may be taken to counteract hyperventilation.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
		Decompression sickness/illness								
(48)		State the normal range of cabin pressure altitude in pressurised commercial aircraft and describe its protective function for aircrew and passengers.	X	X	X	X	X	X		
(49)		Identify the causes of decompression sickness in flight operation.	X	X	X	X	X	X		
(50)		State how decompression sickness can be prevented.	X	X	X	X	X	X		
~~LO (51)~~		~~State the threshold for the onset of decompression sickness in terms of altitude.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
~~LO (52)~~		~~State the approximate altitude above which decompression sickness is likely to occur.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(53)		List the symptoms of decompression sickness (bends, creeps, chokes, staggers).	X	X	X	X	X	X		Clarity
(54)		Indicate how decompression sickness may be treated.	X	X	X	X	X	X		
(55)		List the vital actions the crew has to perform when cabin pressurisation is lost (oxygen mask on,	X	X	X	X	X	X		Clarity

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
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		emergency descent, land as soon as possible and no further flight for the next minimum 24 hours). State that decompression sickness symptoms can occur up to 24 hours later.								
(56)		Define the hazards of diving and flying, and give the recommendations associated with these activities.	X	X	X	X	X	X		
		Acceleration								
(57)		Define 'linear', 'angular' and 'radial acceleration'.	X	X	X	X	X	X	X	
(58)		Describe the effects of acceleration on the circulation and blood volume distribution.	X	X	X	X	X	X	~~X~~	
(59)		List the factors determining the effects of acceleration on the human body.	X	X	X	X	X	X	X	
(60)		Describe the measures which may be taken to increase tolerance to positive acceleration.	X	X	X	X	X	X	~~X~~	
(61)		List the effects of positive acceleration with respect to type, sequence and ~~the~~ corresponding G-load.	X	X	X	X	X	X	~~X~~	
		Carbon monoxide								
(62)		State how carbon monoxide may be produced.	X	X	X	X	X	X		
(63)		State how the presence of carbon monoxide in the blood affects the distribution of oxygen.	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			
(64)		List the signs and symptoms of carbon-monoxide poisoning.	X	X	X	X	X	X		
(65)		Indicate how carbon-monoxide poisoning can be treated and countermeasures that can be adopted.	X	X	X	X	X	X		
040 02 01 03		***High-altitude environment***								
		~~***Ozone***~~								
~~LO (01)~~		~~State how an increase in altitude may change the proportion of ozone in the atmosphere.~~	~~X~~		~~X~~	~~X~~				
~~LO (02)~~		~~List the possible harmful effects of ozone.~~	~~X~~		~~X~~	~~X~~				
		Radiation								
(03)		State the sources of radiation at high altitude.	X		X	X				
(04)		List the effects of excessive exposure to radiation.	X		X	X				
~~LO (05)~~		~~State the effect of sun storms on the amount of radiation at high altitude.~~	~~X~~		~~X~~	~~X~~				
~~LO (06)~~		~~List the harmful effects that may result from the extra radiation that may be generated as the result of a sun storm (solar flares).~~	~~X~~		~~X~~	~~X~~				
~~LO (07)~~		~~List the methods of reducing the effects of extra radiation that may be generated as the result of a sun storm (solar flares).~~	~~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			
		Humidity								
(08)		Define the terms 'humidity' and 'relative humidity'.	X		X	X				
(09)		List the factors which affect the relative humidity of both the atmosphere and cabin air.	X		X	X				
~~LO (10)~~		~~State the methods of reducing the effects of insufficient humidity.~~	~~X~~		~~X~~	~~X~~				
(11)		List the physiological effects of dry cabin air on the human body and indicate measures to diminish these effects. Stress the effects that low humidity can have on the efficient functioning of the eye.	X		X	X				
		~~***Extreme temperatures***~~								
~~LO (12)~~		~~Explain the change in the need for oxygen of the human body when exposed to extreme environmental temperatures.~~	~~X~~		~~X~~	~~X~~				
040 02 02 00		**Man and environment: the sensory system**								
(01)		List the different senses.	X	X	X	X	X	X	X	
~~LO (02)~~		~~State the multisensory nature of human perception.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
040 02 02 01		***Central, peripheral and autonomic nervous systems***								
(01)		Name the main parts of the central nervous system.	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			
(02)		State the basic functions of the central nervous system (CNS), the peripheral nervous system (PNS), and the autonomic (vegetative) nervous system (ANS).	X	X	X	X	X	X		
(03)		Discuss broadly how information is processed by the nervous system and the role of reflexes.	X	X	X	X	X	X		
(04)		Define the division of the peripheral nerves into sensory and motor nerves.	X	X	X	X	X	X		
(05)		State that a nerve impulse is an electrochemical phenomenon.	X	X	X	X	X	X		
(06)		Define the term 'sensory threshold'.	X	X	X	X	X	X		
(07)		Define the term 'sensitivity', especially in the context of vision.	X	X	X	X	X	X		
(08)		Give examples of sensory adaptation.	X	X	X	X	X	X		
~~LO (09)~~		~~Define the term 'habituation' and state its implication for flight safety.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(10)		Define the biological control systems as neurohormonal processes that are highly self-regulated in the normal environment.	X	X	X	X	X	X		
040 02 02 02		***Vision***								
		Functional anatomy								

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
			ATPL	CPL	ATPL /IR	ATPL	CPL			
(01)		Name the most important parts of the eye and the pathway to the visual cortex.	X	X	X	X	X	~~X~~		
(02)		State the basic functions of the parts of the eye.	X	X	X	X	X	X		
(03)		Define 'accommodation'.	X	X	X	X	X	X		
(04)		Distinguish between the functions of the rod and cone cells.	X	X	X	X	X	X		
(05)		Describe the distribution of rod and cone cells in the retina and explain their relevance to~~n~~ vision.	X	X	X	X	X	X		
		Visual foveal and peripheral vision								
(06)		Explain the terms 'visual acuity', 'visual field', 'central vision', 'peripheral vision' and 'fovea', and explain their function in the process of vision.	X	X	X	X	X	X		
(07)		List the factors which may degrade visual acuity and the importance of 'lookout'.	X	X	X	X	X	X		
(08)		State the limitations of night vision and the different scanning techniques by both night and day ~~(regularly spaced eye movements each covering an overlapping sector of about 10°)~~.	X	X	X	X	X	X		
(09)		Explain the adaptation mechanism in vision to cater for reduced and increased levels of illumination.	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			
(10)		State the time necessary for the eye to adapt both to dark and bright light.	X	X	X	X	X	X		
(11)		State the effect of hypoxia, ~~and~~ smoking and altitude in excess of 5 000 ft on night vision.	X	X	X	X	X	X		Clarity
(12)		Explain the nature of colour blindness and the significance of the 'blind spot' on the retina in detecting other traffic in flight.	X	X	X	X	X	X		
		Binocular and monocular vision								
(13)		Distinguish between monocular and binocular vision.	X	X	X	X	X	X		
(14)		Explain the basis of depth perception and its relevance to flight performance.	X	X	X	X	X	X		
(15)		List the possible monocular cues for depth perception.	X	X	X	X	X	X		
(16)		State the problems of vision associated with higher energy blue light and ultraviolet rays.	X	X	X	X	X	X		
		Defective vision								
(17)		Explain long-sightedness, short-sightedness and astigmatism.	X	X	X	X	X	X		
(18)		List the causes of and the precautions that may be taken to reduce the probability of vision loss due to: — presbyopia,	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			
		— cataracts, — glaucoma.								
(19)		List the types of sunglasses which could cause perceptional problems in flight.	X	X	X	X	X	X		
(20)		List the measures which may be taken to protect oneself from flash blindness.	X	X	X	X	X	X		
(21)		State the possible problems associated with contact lenses.	X	X	X	X	X	X		
(22)		State the current rules/regulations governing the wearing of corrective spectacles and contact lenses when operating as a pilot.	X	X	X	X	X	X		
040 02 02 03		***Hearing***								
		Descriptive and functional anatomy								
~~LO (01)~~		~~State the audible range of the human ear.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(02)		State the unit of measure for the intensity of sound.	X	X	X	X	X	X		
(03)		Name the most important parts of the ear and the associated neural pathway.	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(04)		State the basic functions of the different parts of the auditory system.	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(05)		Differentiate between the functions of the vestibular	~~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			
		apparatus and the cochlea in the inner ear.								
(06)		State the role of the Eustachian tube in equalising pressure between the middle ear and the environment.	X	X	X	X	X	X		
(07)		Indicate the effects of colds, flu and hay fever on the ability to equalise pressure in the above.	X	X	X	X	X	X		Clarity
		Hearing loss								
(08)		Define the main causes of the following hearing defects/loss: — 'conductive deafness'; — 'n~~N~~oise-i~~I~~nduced h~~H~~earing l~~L~~oss' (NIHL); — 'presbycusis'.	X	X	X	X	X	X		
(09)		Summarise the effects of environmental noise on hearing.	X	X	X	X	X	X		
(10)		State the decibel level of received noise that will cause NIHL.	X	X	X	X	X	X		
~~LO (11)~~		~~Indicate the factors, other than noise level, which may lead to NIHL.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(12)		Identify the potential occupational risks which may cause hearing loss.	X	X	X	X	X	X		
(13)		List the main sources of hearing loss in the flying	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			
		environment.								
(14)		List the precautions that may be taken to reduce the probability of onset of hearing loss.	X	X	X	X	X	X		
040 02 02 04		***Equilibrium***								
		Functional anatomy								
(01)		List the main elements of the vestibular apparatus.	X	X	X	X	X	X	~~X~~	
(02)		State the functions of the vestibular apparatus on the ground and in flight.	X	X	X	X	X	X	~~X~~	
(03)		Distinguish between the component parts of the vestibular apparatus in the detection of linear and angular acceleration as well as on gravity.	X	X	X	X	X	X	~~X~~	
(04)		Explain how the semicircular canals are stimulated.	X	X	X	X	X	X	~~X~~	
		Motion sickness								
(05)		Describe airsickness and its accompanying symptoms.	X	X	X	X	X	X	X	
(06)		Indicate that vibration can cause undesirable human responses because of the resonance of the skull and the eyeballs.	X	X	X	X	X	X		
(07)		List the causes of motion sickness.	X	X	X	X	X	X	X	
(08)		Describe the necessary actions to be taken to counteract the symptoms of motion sickness.	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			
040 02 02 05		***Integration of sensory inputs***								
(01)		State the interaction between vision, equilibrium, proprioception and hearing to obtain spatial orientation in flight.	X	X	X	X	X	X	X	
(02)		Define the term 'illusion'.	X	X	X	X	X	X	X	
(03)		Give examples of visual illusions based on shape constancy, size constancy, aerial perspective, atmospheric perspective, the absence of focal or ambient cues, autokinesis, vectional false horizons and surface planes.	X	X	X	X	X	X	X	
(04)		Relate these illusions to problems that may be experienced in flight and identify the danger attached to them.	X	X	X	X	X	X	X	
(05)		State the conditions which cause the 'black-hole' effect and 'empty-field myopia'.	X	X	X	X	X	X	~~X~~	
(06)		Give examples of approach and landing illusions, state the danger involved and give recommendations to avoid or counteract these problems.	X	X	X	X	X	X	X	
(07)		State the problems associated with flickering lights (strobe lights, anti-collision lights, propellers and rotors under certain light conditions, etc.).	X	X	X	X	X	X	X	Clarity

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
			ATPL	CPL	ATPL /IR	ATPL	CPL			
(08)		Give examples of vestibular illusions such as somatogyral (the Leans), Coriolis, somatogravic and G-effect illusions.	X	X	X	X	X	X	X	
(09)		Relate the above-mentioned vestibular illusions to problems encountered in flight and state the dangers involved.	X	X	X	X	X	X	X	
(10)		List and describe the function of the proprioceptive senses ('seat-of-the-pants' sense).	X	X	X	X	X	X	X	
~~LO (11)~~		~~Relate illusions of the proprioceptive senses to the problems encountered during flight.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(12)		State that the 'seat-of-the-pants' sense is completely unreliable when visual contact with the ground is lost or when flying in instrument meteorological conditions (IMC) or poor visual horizon.	X	X	X	X	X	X	X	
(13)		Differentiate between vertigo, Coriolis effect and spatial disorientation.	X	X	X	X	X	X	X	
(14)		Explain the flicker effect (stroboscopic effect) and discuss the countermeasures.	X	X	X	X	X	X	X	
(15)		Explain how spatial disorientation can result from a mismatch in sensory input and information processing.	X	X	X	X	X	X	X	
(16)		List the measures to prevent and/or overcome spatial	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			
		disorientation.								
040 02 03 00		**Health and hygiene**								
040 02 03 01		***~~Personal hygiene~~ Intentionally left blank***								
~~LO (01)~~		~~Summarise the role of personal hygiene as a factor in human performance.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
040 02 03 02		***Body rhythm and sleep***								
(01)		Name some internal body rhythms and their relevance to sleep. Explain that the most important of which is body temperature.	X		X	X				Clarity
(02)		Explain the term 'circadian rhythm'.	X		X	X				
(03)		State the approximate duration of a 'free-running' rhythm.	X		X	X				
(04)		Explain the significance of the 'internal clock' in regulating the normal circadian rhythm.	X		X	X				
~~LO (05)~~		~~State the effect of the circadian rhythm of body temperature on an individual's performance standard and the effect on an individual's sleep patterns.~~	~~X~~		~~X~~	~~X~~				
(06)		List and describe the stages of a sleep cycle.	X		X	X				
(07)		Differentiate between rapid eye movement (REM) and non-REM sleep.	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			
(08)		Explain the function of sleep and describe the effects of insufficient sleep on performance.	X		X	X				
(09)		Explain the simple calculations for the sleep/wake credit/debit situation.	X		X	X				
(10)		Explain how sleep debit can become cumulative.	X		X	X				
(11)		State the time formula for the adjustment of body rhythms to the new local time scale after crossing time zones.	X		X	X				
(12)		State the problems caused by circadian disrhythmia (jet lag) with regard to an individual's performance and sleep.	X		X	X				
(13)		Differentiate between the effects of westbound and eastbound travel.	X		X	X				
(14)		Explain the interactive effects of circadian rhythm and vigilance on a pilot's performance during flight as the duty day elapses.	X		X	X				
(15)		Describe the main effects of lack of sleep on an individual's performance.	X		X	X				
(16)		List the possible coping strategies for jet lag.	X		X	X				
040 02 03 03		***Problem areas for pilots***								

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
			ATPL	CPL	ATPL /IR	ATPL	CPL			
		Common minor ailments								
(01)		State the role of the Eustachian tube in equalising pressure between the middle ear and the environment.	X	X	X	X	X	X		
(02)		State that the in-flight environment may increase the severity of symptoms which may be minor while on the ground.	X	X	X	X	X	X		
(03)		List the negative effects of suffering from colds or flu on flight operations especially with regard to the middle ear, the sinuses, and the teeth.	X	X	X	X	X	X		
(04)		Indicate the effects of colds or flu on the ability to equalise pressure between the middle ear and the environment.	X	X	X	X	X	X		
(05)		State when a pilot should seek medical advice from an aeromedical examiner (AME), and when the aeromedical section of an authority should be informed.	X	X	X	X	X	X		
(06)		Describe the measures to prevent and/or clear problems due to pressure changes during flight.	X	X	X	X	X	X		
		Entrapped gases and barotrauma								
(07)		Define 'barotrauma'.	X	X	X	X	X	X		
(08)		Differentiate between otic, sinus, gastrointestinal and	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			
		aerodontalgia (of the teeth) barotraumas and explain avoidance strategies.								
(09)		Explain why the effects of otic barotrauma can be worse in the descent.	X	X	X	X	X	X		
		Gastrointestinal upsets								
(10)		State the effects of gastrointestinal upsets that may occur during flight.	X	X	X	X	X	X		
(11)		List the precautions that should be observed to reduce the occurrence of gastrointestinal upsets.	X	X	X	X	X	X		
(12)		Indicate the major sources of gastrointestinal upsets.	X	X	X	X	X	X		
		Obesity								
(13)		Define 'obesity'.	X	X	X	X	X	X		
(14)		State the cause of obesity.	X	X	X	X	X	X		
(15)		State the harmful effects of obesity on the following: — possibility of developing coronary problems; — increased chances of developing diabetes; — ability to withstand G forces; — the development of problems with the joints of the limbs; — general circulatory problems;	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			
		— ability to cope with hypoxia and/or decompression sickness.								
(16)		State the relationship between obesity and body mass index (BMI).	X	X	X	X	X	X		
(17)		Calculate the BMI of an individual (given weight in kilograms and height in metres) and state whether this BMI indicates that the individual is underweight, overweight, obese or within the normal range of body weight.	X	X	X	X	X	X		
(18)		Describe the problems associated with Type 2 (mostly adult) diabetes: — risk factors; — insulin resistance; — complications (vascular, neurological) and the consequences for the medical licence; — pilots are not protected from Type 2 diabetes more than other people.	X	X	X	X	X	X		
		~~***Back pain***~~								
~~LO (19)~~		~~Describe the typical back problems (unspecific back pain, slipped disc) that pilots have. Explain also the ways of preventing and treating these problems:~~	~~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			
		~~— good sitting posture;~~ ~~— lumbar support;~~ ~~— good physical condition;~~ ~~— in-flight exercise, if possible;~~ ~~— physiotherapy.~~								
		Food hygiene								
~~LO (20)~~		~~Explain the significance of food hygiene with regard to general health.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(21)		Stress the importance of and methods to be adopted by aircrew especially when travelling abroad to avoid contaminated food and liquids.	X	X	X	X	X	X		
(22)		List the major contaminating sources in foodstuffs.	X	X	X	X	X	X		
(23)		State the major constituents of a healthy diet.	X	X	X	X	X	X		
(24)		State the measure to avoid hypoglycaemia.	X	X	X	X	X	X		
~~LO (25)~~		~~State the role vitamins and trace elements are playing in a healthy diet.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(26)		State the importance of adequate hydration.	X	X	X	X	X	X		
	1.1.1.	1.1.1.1.1.2 **Tropical climates**								
(27)		List the problems associated with operating in tropical climates.	X		X	X				

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
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(28)		State the possible causes/sources of incapacitation in tropical or poorly developed countries with reference to: — standards of hygiene; — quality of water supply; — insectborne diseases; — parasitic worms; — rabies or other diseases that may be spread through~~by~~ contact with animals; — sexually transmitted diseases.	X		X	X				
(29)		State the precautions to be taken to reduce the risks of developing problems in tropical areas.	X		X	X				
		Infectious diseases								
(30)		State the major infectious diseases that may kill or severely incapacitate individuals.	X	X	X	X	X	X		
~~LO (31)~~		~~State which preventative hygienic measures, vaccinations, drugs and other measures reduce the chances of catching these diseases.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(32)		State the precautions which must be taken to ensure that disease-carrying insects are not transported between areas.	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			
040 02 03 04		***Intoxication***								
		Tobacco								
(01)		State the harmful effects of tobacco on: — the respiratory system; — the cardiovascular system; — the ability to resist hypoxia; — the ability to tolerate G forces; — night vision.	X	X	X	X	X	X		
		Caffeine								
(02)		Indicate the level of caffeine dosage at which performance is degraded.	X	X	X	X	X	X		
(03)		Besides coffee, indicate other beverages containing caffeine.	X	X	X	X	X	X		
		Alcohol								
(04)		State the maximum acceptable limit of alcohol for flight crew according to the applicable regulations.	X	X	X	X	X	X		
(05)		State the effects of alcohol consumption on: — the ability to reason; — inhibitions and self-control;	X	X	X	X	X	X		

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			ATPL	CPL	ATPL /IR	ATPL	CPL			
		— vision; — the sense of balance and sensory illusions; — sleep patterns; — hypoxia.								
(06)		State the effects alcohol may have if consumed together with other drugs.	X	X	X	X	X	X		
(07)		List the signs and symptoms of alcoholism.	X	X	X	X	X	X		
(08)		List the factors which may be associated with the development of alcoholism.	X	X	X	X	X	X		
(09)		Define the 'unit' of alcohol and state the approximate elimination rate from the blood.	X	X	X	X	X	X		
(10)		State the maximum daily and weekly intake of units of alcohol which may be consumed without causing damage to organs and systems in the body.	X	X	X	X	X	X		
(11)		Discuss the actions that might be taken if a crew member is suspected of being an alcoholic.	X		X	X				
(12)		State the reasons why aviation professions are particularly vulnerable to the excessive use of alcohol.	X		X	X				
		Drugs and self-medication								
(13)		State the dangers associated with the use of non-	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			
		prescription drugs.								
(14)		State the side effects of common non-prescription drugs used to treat colds, flu, hay fever and other allergies, especially medicines containing antihistamine preparations.	X	X	X	X	X	X		
(15)		Interpret the rules relevant to using (prescription or non-prescription) drugs that the pilot has not used before.	X	X	X	X	X	X		
(16)		Interpret the general rule that 'if a pilot is so unwell that they require any medication, then they should consider themselves unfit to fly'.	X	X	X	X	X	X		
		Toxic materials								
(17)		List those materials present in an aircraft which may, when uncontained, cause severe health problems.	X	X	X	X	X	X		
(18)		List those aircraft-component parts which if burnt may give off toxic fumes.	X	X	X	X	X	X		
040 02 03 05		***Incapacitation in flight***								
(01)		State that incapacitation is most dangerous when its onset is insidious.	X	X	X	X	X	X		
(02)		List the major causes of in-flight incapacitation.	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			
(03)		State the importance of crew to be able to recognise and promptly react upon incapacitation of other crew members, should it occur in flight.	X		X	X				
(04)		Explain coping methods and procedures.	X	X	X	X	X	X		
040 03 00 00		**BASIC AVIATION PSYCHOLOGY**								
040 03 01 00		**Human information processing**								
040 03 01 01		***Attention and vigilance***								
(01)		Differentiate between 'attention' and 'vigilance'.	X	X	X	X	X	X		
(02)		Differentiate between 'selected' and 'divided' attention.	X	X	X	X	X	X		
(03)		Define 'hypovigilance'.	X	X	X	X	X	X		
(04)		Identify the factors which may affect the state of vigilance.	X	X	X	X	X	X		
(05)		List the factors that may forestall hypovigilance during flight.	X	X	X	X	X	X		
(06)		Indicate the signs of reduced vigilance.	X	X	X	X	X	X		
(07)		Name the factors that affect a person's level of attention.	X	X	X	X	X	X		
040 03 01 02		***Perception***								

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
			ATPL	CPL	ATPL /IR	ATPL	CPL			
(01)		Name the basis of the perceptual process.	X	X	X	X	X	X		
(02)		Describe the mechanism of perception ('bottom-up'/'top-down' process).	X	X	X	X	X	X		
(03)		Illustrate why perception is subjective and state the relevant factors which influence interpretation of perceived information.	X	X	X	X	X	X		
(04)		Describe some basic perceptual illusions.	X	X	X	X	X	X		
(05)		Illustrate some basic perceptual concepts.	X	X	X	X	X	X		
(06)		Give examples where perception plays a decisive role in flight safety.	X	X	X	X	X	X		
(07)		Stress how persuasive and believable mistaken perception can manifest itself both on an individual and a group.	X	X	X	X	X	X		
040 03 01 03		***Memory***								
(01)		Explain the link between the types of memory (to include sensory, working/short-term and long-term memory.	X	X	X	X	X	X		
(02)		Describe the differences between the types of memory in terms of capacity and retention time.	X	X	X	X	X	X		
(03)		Justify the importance of sensory-store memories in	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			
		processing information.								
(04)		State the average maximum number of separate items that may be held in working memory (7, ± 2).	X	X	X	X	X	X		Clarity
(05)		Stress how interruption can affect short-term/working memory.	X	X	X	X	X	X		
(06)		Give examples of items that are important for pilots to hold in working memory during flight.	X	X	X	X	X	X		
(07)		Describe how the capacity of the working-memory store may be increased.	X	X	X	X	X	X		
(08)		State the subdivisions of long-term memory and give examples of their content.	X	X	X	X	X	X		
(09)		Explain that skills are kept primarily in the long-term memory.	X	X	X	X	X	X		
(10)		Describe amnesia and how it affects memory.	X	X	X	X	X	X		
(11)		Name the common problems with both the long- and short-term memories and the best methods to try to counteract them.	X	X	X	X	X	X		
040 03 01 04		***Response selection***								
		Learning principles and techniques								
(01)		Explain and distinguish between the following basic	X	X	X	X	X	X		

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			ATPL	CPL	ATPL /IR	ATPL	CPL			
		forms of learning: — classicand operant conditioning (behaviouristic approach); — learning by insight (cognitive approach); — learning by imitating (modelling).								
~~LO (02)~~		~~Find pilot-related examples for each of these learning forms.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(03)		State the factors which are necessary for and promote the quality of learning.	X	X	X	X	X	X		
(04)		Explain ways to facilitate the memorisation of information with the following learning techniques: — mnemonics; — mental training.	X	X	X	X	X	X		
(05)		Describe the advantage of planning and anticipation of future actions: — define the term ‘skills’; — state the three phases of learning a skill (Anderson: cognitive, associative and automatic phases).	X	X	X	X	X	X		Clarity
(06)		Explain the term ‘motor programme’ or ‘mental schema’.	X	X	X	X	X	X		

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
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(07)		Describe the advantages and disadvantages of mental schemata.	X	X	X	X	X	X		
(08)		Explain the Rasmussen model which describes the guidance of a pilot's behaviour in different situations.	X	X	X	X	X	X		
(09)		State the possible problems or risks associated with skill-based, rule-based and knowledge-based behaviour.	X	X	X	X	X	X		
~~LO (10)~~		~~Explain the following phases in connection with the acquisition of automated behaviour:~~ ~~— cognitive phase;~~ ~~— associative phase;~~ ~~— automatic phase.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
		Motivation								
(11)		Define 'motivation'.	X	X	X	X	X	X		
~~LO (12)~~		~~Explain the influences of different levels of motivation on performance taking into consideration task difficulty.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
~~LO (13)~~		~~Explain the 'Model of human needs' (Maslow) and relate this to aviation.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(14)		Explain the relationship between motivation and	X	X	X	X	X	X		

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			ATPL	CPL	ATPL /IR	ATPL	CPL			
		learning.								
(15)		Explain the problems of over-motivation, especially in the context of extreme need of achievement.	X	X	X	X	X	X		
040 03 02 00		**Human error and reliability**								
040 03 02 01		***Reliability of human behaviour***								
(01)		Name and explain the factors which influence human reliability.	X	X	X	X	X	X		
040 03 02 02		***Mental models and situation awareness***								
(01)		Define the term 'situation awareness'.	X	X	X	X	X	X	X	
(02)		List the cues which indicate loss of situation awareness and name the steps to regain it.	X	X	X	X	X	X	X	
(03)		List the factors which influence one's situation awareness both positively and negatively, and stress the importance of situation awareness in the context of flight safety.	X	X	X	X	X	X	X	
(04)		Define the term 'mental model' in relation to a surrounding complex situation.	X	X	X	X	X	X	X	
(05)		Describe the advantages/disadvantages of mental models.	X	X	X	X	X	X	X	
(06)		Explain the relationship between personal 'mental	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			
		models' and the creation of cognitive illusions.								
040 03 02 03		***Theory and model of human error***								
(01)		Define the term 'error'.	X	X	X	X	X	X	X	
(02)		Explain the concept of the 'error chain'.	X	X	X	X	X	X	X	
(03)		Differentiate between an isolated error and an error chain.	X	X	X	X	X	X	X	
(04)		Distinguish between the main forms/types of errors (i.e. slips, faults, omissions and violations).	X	X	X	X	X	X	X	
(05)		Discuss the above errors and their relevance in flight.	X	X	X	X	X	X	X	
(06)		Distinguish between an active and a latent error and give examples.	X	X	X	X	X	X	X	
040 03 02 04		***Error generation***								
(01)		Distinguish between internal and external factors in error generation.	X	X	X	X	X	X	X	
(02)		Identify possible sources of internal error generation.	X	X	X	X	X	X	X	
(03)		Define and discuss the two errors associated with motor programmes (action slip and environmental capture).	X	X	X	X	X	X	X	Clarity
(04)		List the three main sources of external error generation in the cockpit.	X	X	X	X	X	X	X	

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
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(05)		Give examples to illustrate the following factors in external error generation in the cockpit: — ergonomics, — economics, — social environment.	X	X	X	X	X	X	X	
(06)		Name the major goals in the design of human-centred man–machine interfaces.	X	X	X	X	X	X	X	
(07)		Define the term ‘error tolerance’.	X	X	X	X	X	X	X	
(08)		List (and describe) strategies which are used to reduce human error.	X	X	X	X	X	X	X	
040 03 03 00		**Decision-making**								
040 03 03 01		***Decision-making concepts***								
(01)		Define the terms ‘deciding’ and ‘decision-making’.	X	X	X	X	X	X	X	
(02)		Describe the major factors on which decision-making should be based during the course of a flight.	X	X	X	X	X	X	X	
(03)		Describe the main human attributes with regard to decision-making.	X	X	X	X	X	X	X	
(04)		Discuss the nature of bias and its influence on the decision-making process.	X	X	X	X	X	X	X	
(05)		Describe the main error sources and limits in an	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			
		individual's decision-making mechanism.								
(06)		State the factors upon which an individual's risk assessment is based.	X	X	X	X	X	X	X	
(07)		Explain the relationship between risk assessment, commitment and pressure of time in ~~on~~ decision-making strategies.	X	X	X	X	X	X	X	
(08)		Explain the risks associated with dispersion and/or channelised attention during the application of procedures requiring a high workload within a short time frame (e.g. a go-around).	X	X	X	X	X	X		
(09)		Describe the positive and negative influences exerted by other group members on an individual's decision-making process (risky shift).	X	X	X	X	X	X	X	
(10)		Explain the general idea behind the creation of a model for decision-making based upon: — definition of the aim; — collection of information; — risk assessment; — development of options; — evaluation of options; — decision;	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			
		— implementation; — consequences; — review and feedback.								
040 03 04 00		**Avoiding and managing errors: cockpit management**								
040 03 04 01		***Safety awareness***								
(01)		Justify the need for being aware of not only one's own performance but that of others before and during a flight and the possible consequences and/or risks.	X	X	X	X	X	X	X	
~~LO (02)~~		~~Stress the overall importance of constantly and positively striving to monitor for errors and thereby maintaining situation awareness.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	
040 03 04 02		***Coordination (multi-crew concepts)***								
(01)		Name the objectives of the multi-crew concept.	X		X	X				
(02)		State and explain the elements of multi-crew concepts.	X		X	X				
(03)		Describe the concepts of 'standard operating procedures' (SOPs), checklists and crew briefings.	X		X	X				Required knowledge
(04)		Describe the purpose and procedure of crew briefings.	X		X	X				
(05)		Describe the purpose and procedure of checklists.	X		X	X				
(06)		Describe the function of communication in a coordinated team.	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			
(07) New		Explain the advantages of SOPs.	X	X	X	X	X			
(08) New		Explain how SOPs contribute to avoiding, reducing and managing threats and errors.	X	X	X	X	X			
(09) New		Explain potential threats of SOPs, for example during company and/or type conversion (e.g. motor programmes, company culture, hazardous attitudes, developed habits).	X	X	X	X	X			
040 03 04 03		***Cooperation***								
(01)		Distinguish between cooperation and coaction.	X		X	X				
(02)		Define the term ‘group’.	X		X	X				
(03)		Illustrate the influence of interdependence in a group.	X		X	X				
(04)		List the advantages and disadvantages of teamwork.	X		X	X				
(05)		Explain the term ‘synergy’.	X		X	X				
(06)		Define the term ‘cohesion’.	X		X	X				
(07)		Define the term ‘groupthink’.	X		X	X				
(08)		State the essential conditions for good teamwork.	X		X	X				
(09)		Explain the function of role and norm in a group.	X		X	X				
(10)		Name the different role patterns which occur in a group situation.	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			
(11)		Explain how behaviour can be affected by the following factors: — persuasion, — conformity, — compliance, — obedience.	X		X	X				
(12)		Distinguish between status and role.	X		X	X				
(13)		Stress the inherent dangers of a situation where there is a mix of role and status within the cockpit.	X		X	X				
(14)		Explain the terms ‘leadership’ and ‘followership’.	X		X	X				
(15)		Describe the trans-cockpit authority gradient and its affiliated leadership styles (i.e. autocratic, laissez-faire and synergistic).	X		X	X				
(16)		Name the most important attributes of a positive leadership style.	X		X	X				
040 03 04 04		***Communication***								
~~LO (01)~~		~~Explain the function of ‘information’.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(02)		Define the term ‘communication’.	X	X	X	X	X	X		
(03)		List the most basic components of interpersonal communication.	X	X	X	X	X	X		

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
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(04)		Explain the advantages of two-way communication as opposed to one-way communication.	X	X	X	X	X	X		
~~LO (05)~~		~~Explain Watzlawick's statement 'One cannot not communicate'.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(06)		Distinguish between verbal and non-verbal communication.	X	X	X	X	X	X		
(07)		Name the functions of non-verbal communication.	X	X	X	X	X	X		
(08)		Describe the general aspects of non-verbal communication.	X	X	X	X	X	X		
(09)		Describe the advantages/disadvantages of implicit and explicit communication.	X	X	X	X	X	X		
(10)		Describe ~~State~~ the advantages ~~attributes~~ and possible problems of using 'social' and 'professional' language in high- and low-workload situations.	X	X	X	X	X	X		
(11)		Name and explain the major obstacles to effective communication.	X	X	X	X	X	X		
~~LO (12)~~		~~Give examples of aircraft accidents arising from poor communication.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(13)		Explain the difference between intrapersonal and interpersonal conflict.	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			
(14)		Describe the escalation process in human conflict.	X	X	X	X	X	X		
(15)		List the typical consequences of conflicts between crew members.	X	X	X	X	X	X		
(16)		Explain the following terms as part of the communication practice with regard to preventing or resolving conflicts: — inquiry, — active listening, — advocacy, — feedback, — metacommunication, — negotiation.	X	X	X	X	X	X		
(17) New		Describe the advantages and limitations of communication (listening, verbal, non-verbal and visual) in differing professional situations and environments.	X	X	X	X	X	X		
040 03 05 00		**Human behaviour**								
040 03 05 01		***Personality, attitude and behaviour***								
(01)		Describe the factors which determine an individual's behaviour.	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			
(02)		Define and distinguish between 'personality', 'attitude' and 'behaviour'.	X	X	X	X	X	X		
(03)		State the origin of personality and attitudes.	X	X	X	X	X	X		
(04)		State that with behaviours good and bad habits can be formed.	X	X	X	X	X	X		
(05)		Explain how behaviour is generally a product of personality and attitude.	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(06)		~~Discuss some~~ State the effects that personality and attitudes may have on flight crew performance.	X	X	X	X	X	X		Clarity
040 03 05 02		***Individual differences in personality and motivation***								
(01)		Describe the individual differences in personality by means of a common trait model (e.g. Eysenck's personality factors) and use it to describe today's ideal pilot.	X	X	X	X	X	X		
		Self-concept								
(02)		Define the term 'self-concept' and the role it plays in any change of personality.	X	X	X	X	X	X		
(03)		Explain how a self-concept of underconfidence may lead to an outward show of aggression and self-assertiveness.	X	X	X	X	X	X		

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			ATPL	CPL	ATPL /IR	ATPL	CPL			
		Self-discipline								
(04)		Define 'self-discipline' and justify its importance for flight safety.	X	X	X	X	X	X		
040 03 05 03		***Identification of hazardous attitudes (error proneness)***								
(01)		Summarise dangerous attitudes in aviation: anti-authority, macho, impulsive, invulnerable, careless, resignation.	X		X	X				Clarity
(02)		Describe the personality attitude and behaviour patterns of an ideal crew member.	X		X	X				
(03)		Summarise how a person's attitude influences their work in the cockpit.	X		X	X				
040 03 06 00		**Human overload and underload**								
040 03 06 01		***Arousal***								
(01)		Explain the term 'arousal'.	X	X	X	X	X	X		
(02)		Describe the relationship between arousal and performance.	X	X	X	X	X	X		
(03)		Explain the circumstances under which underload may occur and its possible dangers.	X	X	X	X	X	X		
040 03 06 02		***Stress***								

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR(A) & EIR	Comments
			ATPL	CPL	ATPL /IR	ATPL	CPL			
~~LO (01)~~		~~Explain the term 'homeostasis'.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(02)		Explain the term 'stress' and why stress is a natural human reaction.	X	X	X	X	X	X		
(03)		State that the physiological response to stress is generated by the 'fight or flight' response.	X	X	X	X	X	X		
(04)		Describe the function of the autonomic nervous system (ANS) in stress response.	X	X	X	X	X	X		
(05)		Explain the biological reaction to stress by means of the 'general adaptation syndrome' (GAS).	X	X	X	X	X	X	X	
(06)		Explain the relationship between arousal and stress.	X	X	X	X	X	X		
(07)		State the relationship between stress and performance.	X	X	X	X	X	X		
(08)		State the basic categories of stressors.	X	X	X	X	X	X		
(09)		List and discuss the major environmental sources of stress in the cockpit.	X	X	X	X	X	X		
(10)		Discuss the concept of 'break point' with regard to stress, overload and performance.	X	X	X	X	X	X		
(11)		Name the principal causes of domestic stress.	X	X	X	X	X	X		
(12)		State that the stress experienced as a result of particular demands varies between individuals.	X	X	X	X	X	X		
(13)		Explain the factors which lead to differences in the	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			
		levels of stress experienced by individuals.								
(14)		List the factors influencing the tolerance of stressors.	X	X	X	X	X	X		
~~LO (15)~~		~~Explain a simple model of stress.~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
(16)		Explain the relationship between stress and anxiety.	X	X	X	X	X	X		
(17)		Describe the effects of anxiety on human performance.	X	X	X	X	X	X		
(18)		State the general effect of acute stress on the human system.	X	X	X	X	X	X		
(19)		Name the three phases of GAS (alarm, resistance and exhaustion).	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	Clarity
(20)		Name the symptoms of stress relating to the different phases of GAS.	X	X	X	X	X	X	X	
(21)		Describe the relationship between stress, arousal and vigilance.	X	X	X	X	X	X		
(22)		State the general effect of chronic stress on the human system.	X	X	X	X	X	X		
(23)		Explain the differences between psychological, psychosomatic and somatic stress reactions.	X	X	X	X	X	X		
(24)		Name the typical common physiological and psychological symptoms of human overload.	X	X	X	X	X	X		
(25)		Describe the effects of stress on human behaviour.	X	X	X	X	X	X		

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(26)		Explain how stress is cumulative and how stress from one situation can be transferred to a different situation.	X	X	X	X	X	X	X	
(27)		Explain how successful completion of a stressful task will reduce the amount of stress experienced when a similar situation arises in the future.	X	X	X	X	X	X	X	
(28)		Describe the effect of human underload/overload on effectiveness in the cockpit.	X	X	X	X	X	X	X	
(29)		List sources and symptoms of human underload.	X	X	X	X	X	X	X	
040 03 06 03		***Intentionally left blank***								
040 03 06 04		***Intentionally left blank***								
040 03 06 05		***Fatigue and stress management***								
(01)		Explain the term 'fatigue' and differentiate between the two types of fatigue.	X	X	X	X	X	X		
(02)		Name the causes for both types (short-term and chronic fatigue).	X	X	X	X	X	X		Clarity
(03)		Identify the symptoms and describe the effects of fatigue.	X	X	X	X	X	X		
(04)		List the strategies which prevent or delay the onset of fatigue and hypovigilance.	X	X	X	X	X	X		

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			ATPL	CPL	ATPL /IR	ATPL	CPL			
(05)		List and describe coping strategies for dealing with stress factors and stress reactions.	X	X	X	X	X	X		
(06)		Distinguish between short-term and long-term methods of stress management.	X	X	X	X	X	X		
(07)		Give examples of short-term methods of stress management.	X	X	X	X	X	X		
(08)		Give examples of long-term methods of coping with stress.	X	X	X	X	X	X		
040 03 07 00		**Advanced cockpit automation**								
040 03 07 01		***Advantages and disadvantages***								
(01)		Define and explain the basic concept of automation.	X	X	X	X	X	X	X	
(02)		List the advantages/disadvantages of automation in the cockpit in respect of level of vigilance, attention, workload, situation awareness and crew coordination.	X	X	X	X	X	X	X	
(03)		State the advantages and disadvantages of the two components of the man–machine system with regard to information input and processing, decision-making and output activities.	X	X	X	X	X	X	X	
(04)		Explain the 'ironies of automation'.	X	X	X	X	X	X	X	
(05)		Give examples of methods to overcome the	X	X	X	X	X	X	X	

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			ATPL	CPL	ATPL /IR	ATPL	CPL			
		disadvantages of automation.								
040 03 07 02		***Automation complacency***								
(01)		State the main weaknesses in the monitoring of automatic systems.	X	X	X	X	X	X	X	
(02)		Explain the following terms in connection with automatic systems: — passive monitoring; — blinkered concentration; — confusion; — mode awareness.	X	X	X	X	X	X	X	
(03)		Give examples of actions which may be taken to counteract ineffective monitoring of automatic systems.	X	X	X	X	X	X	X	
(04)		Define ‘complacency’.	X	X	X	X	X	X	X	
040 03 07 03		***Working concepts***								
(01)		Analyse the influence of automation on crew communication and describe the potential disadvantages.	X		X	X				
(02)		Summarise how the negative effects of automation on pilots may be alleviated.	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			
(03)		Interpret the role of automation with respect to flight safety.	X	X	X	X	X	X	X	

AREA 100 LEARNING OBJECTIVES ON KNOWLEDGE, SKILLS AND ATTITUDES (KSA)

The Area 100 'Knowledge, skills and attitudes' (KSA) Learning Objectives (LOs) should be considered by approved training organisations (ATOs) when designing their CPL/ATPL theoretical knowledge course(s). The LOs should be addressed so that the individual student's KSA are developed and assessed throughout their theoretical knowledge training. The training should include practical exercises, of which at least two should be conducted in groups and/or crew pairings.

The practical training could include but not be limited to practical planning exercises, scenario exercises, simulation exercises, assessed discussions, oral scenario interviews, written tests, projects, essays, and/or presentations.

AMC1 to ORA.ATO.230 provides the course design requirements, GM2 to AMC1 ORA.ATO.230 provides guidance on the practical exercises, and GM3 and GM4 to AMC1 ORA.ATO.230 provide the required assessment of the Area 100 KSA.

The LOs of Area 100 KSA are grouped into the ICAO/IATA core competencies, with the addition of knowledge as included in the Airbus core competencies. KSA are embedded within these core competencies.

GM1 to AMC1 FCL.310, FCL.515(b); FCL.615(b) provides guidance to the EASA LO writers, and GM1 to AMC1 to ORA.ATO.225 provides guidance to the ATO and student on the meaning and skill level required by the LO verbs used in the LOs on professional pilot licences and ratings.

The verbs 'demonstrate' and 'show' supplement the cognitive LO verbs for the Area 100 KSA:

— 'demonstrate' means the selection and use of the appropriate KSA within a strategy to achieve an effective outcome. It signifies a high taxonomy level and would normally be assessed using multiple indicators from more than one core competence.

— 'show' means the acquirement of knowledge, skill or attitudes. It signifies a lower taxonomy level than 'demonstrate' and would normally be assessed by a single indicator.

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR & EIR
			ATPL	CPL	ATPL /IR	ATPL	CPL		
100 00 00 00		**KNOWLEDGE, SKILLS AND ATTITUDES (KSA)**							
100 01 00 00		**COMMUNICATION**							
(01)		Show the ability to communicate clearly, accurately and concisely.	X	X	X	X	X		
(02)		Show the ability to listen actively and use appropriate non-verbal language when receiving information.	X	X	X	X	X		
(03)		Show the ability to ask relevant and effective questions.	X	X	X	X	X		
(04)		Show the ability to communicate relevant concerns and intentions.	X	X	X	X	X		
(05)		Show the ability to correctly interpret non-verbal communication.	X	X	X	X	X		
(06)		Show the ability to use appropriate eye contact, body movement, body position and gestures that are consistent with and support verbal messages.	X	X	X	X	X		
(07)		Identify and describe the effects of communication related to the Parent-Adult-Child (PAC) Model (from Transactional Analysis) when reviewing aircraft accidents and incidents and in everyday situations.	X	X	X	X	X		
(08)		Show the effective use of communication related to the 'adult' mode.	X	X	X	X	X		
(09)		Show the appropriate level of confidence in group and assessment situations.	X	X	X	X	X		
(10)		Demonstrate the correct and appropriate use of instrument flight rules (IFR) and visual flight rules (VFR) phraseology in scenario exercises.	X	X	X	X	X		

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR & EIR
			ATPL	CPL	ATPL /IR	ATPL	CPL		
100 02 00 00		**MANAGEMENT OF FLIGHT PATH**							
100 02 01 00		**Management of flight path — automation** To be conducted on suitable training device(s) as specified in AMC1 to Appendix 3 and in GM1 to Appendix 5.							
(01)		Demonstrate flight management system (FMS) initialisation from a given flight plan.	X		X	X			
(02)		Describe the threats of erroneous data inputted into the control display unit.	X		X	X			
(03)		Demonstrate the ability to cross check data inputted into the FMS and identify and correct any error(s).	X		X				
(04)		Explain the advantages, hazards and limitations of automation.	X		X	X			
(05)		Describe typical autopilot modes and the levels of automation.	X		X	X			
(06)		Describe and/or demonstrate how to control a simulated aircraft's vertical and horizontal flight using automation.	X		X	X			
(07)		Describe and/or demonstrate mode awareness of the auto-flight system(s) including engagement, automatic transitions and mode reversion.	X		X				
(08)		Show the selection of appropriate displays, range and information on a navigation display.	X		X	X			
100 03 00 00		**LEADERSHIP AND TEAMWORK**							
(01)		Show the ability to create an atmosphere of open communication and to encourage participation.	X	X	X	X	X		

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(02)		Show the ability to use initiative and give instructions and/or assistance when appropriate.	X	X	X	X	X		
(03)		Show the ability to anticipate and respond appropriately to other's needs.	X	X	X	X	X		
(04)		Show the ability to give and receive feedback constructively.	X	X	X	X	X		
(05)		Show empathy, respect and tolerance for others.	X	X	X	X	X		
(06)		Show the ability to address and resolve conflicts and disagreement in a constructive manner.	X	X	X	X	X		
(07)		Show the ability to project self-control in all situations.	X	X	X	X	X		
100 04 00 00		**PROBLEM-SOLVING AND DECISION-MAKING**							
(01)	X	Describe an effective decision-making process.	X	X	X	X	X		
(02)		Show the ability to seek relevant information from appropriate sources.	X	X	X	X	X		
(03)		Show the ability to identify and consider options effectively in a group or crew situation.	X	X	X	X	X		
(04)		Show the ability to monitor, review and adapt decisions as necessary in a group or crew situation.	X	X	X	X	X		
(05)	X	Identify the factors affecting the availability of time in operational situations and describe appropriate use of this time for decision-making in reviewed situations and/or practical exercises.	X	X	X	X	X		
100 05 00 00		**SITUATION AWARENESS AND RESILIENCE**							

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR & EIR
			ATPL	CPL	ATPL /IR	ATPL	CPL		
100 05 01 00		**Situation awareness**							
(01)		Demonstrate the ability to identify threats, errors and undesirable aircraft states in theoretical and/or practical exercises.	X	X	X	X	X		
(02)		Demonstrate the ability to identify positive and negative situations and manage them for best safety and/or commercial outcomes in practical and/or scenario exercises.	X	X	X	X	X		
(03)		Demonstrate situation awareness using the navigation display and/or instruments and aeronautical charts.	X	X	X	X	X		
(04)		Identify the signs and discuss the effects of stress, fatigue and aviation lifestyle on situation awareness.	X	X	X	X	X		
100 05 02 00		**Resilience**							
(01)	X	Define resilience as 'the ability to recognise, absorb and adapt to disruptions', and describe that it is supported by the pilot's core competencies and improved by experience which can be gained by training for unexpected events or situations.	X	X	X	X	X		
(02)	X	Describe resilience in relation to upset and recovery situations.	X	X	X	X	X		
(03)		Review situation(s) in which a pilot or the flight crew use(s) resilience to counter an upset situation or a situation not covered by standard operating procedures (SOPs).	X	X	X	X	X		
(04)		Demonstrate resilience during scenario and/or other exercises.	X	X	X	X	X		
100 06 00 00		**WORKLOAD MANAGEMENT**							

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR & EIR
			ATPL	CPL	ATPL /IR	ATPL	CPL		
(01)		Show the ability to plan, prioritise and schedule tasks effectively.	X	X	X	X	X		
(02)		Demonstrate the management of interruptions, distractions, variations, commercial requirements, threats, and failures.	X	X	X	X	X		
(03)		Show the ability to ask for help, accept assistance, and offer appropriate assistance.	X	X	X	X	X		
(04)	X	Describe how teamwork and leadership can positively or negatively affect workload management.	X	X	X	X	X		
100 07 00 00		**KNOWLEDGE**							
(01)		Demonstrate the ability to complete pre-flight planning in practical exercises. (Include the ability to apply and relate knowledge from relevant subjects such as but not limited to air law, meteorology, operational procedures, performance, flight planning, load and balance, demonstrating the relevant core competencies and effective threat and error management (TEM).)	X	X	X	X	X		
(02)		Demonstrate in a practical exercise(s) the general preparation of an aircraft for flight, including FMS initialisation. (Include the ability to apply and relate knowledge from relevant subjects such as but not limited to aircraft general knowledge (AGK), performance, flight planning, mass and balance, AGK navigation and operational procedures, and demonstrating the relevant core competencies and effective TEM.)	X	X	X	X	X		

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR & EIR
			ATPL	CPL	ATPL /IR	ATPL	CPL		
(03)		Demonstrate the KSA and TEM relating to taxiing and take-off scenario and/or other exercises. (Include the ability to apply and relate knowledge from relevant subjects such as but not limited to AGK, performance, principles of flight, meteorology, and air law.)	X	X	X	X	X		
(04)		Demonstrate in practical and other exercises the KSA and TEM applicable to climb and cruise scenarios in practical systems exercises and other exercises. (Include the ability to apply and relate knowledge from relevant subjects such as but not limited to AGK, performance, principles of flight, flight planning, navigation, and meteorology.)	X	X	X	X	X		
(05)		Demonstrate in practical exercises the KSA and TEM applicable to descent including energy management, and landing and taxiing phases. (Include the ability to apply and relate knowledge from relevant subjects such as but not limited to AGK, performance, principles of flight, flight planning, navigation, air law, and operational procedures.)	X	X	X	X	X		
100 08 00 00		**Upset prevention and recovery training (UPRT)**							
(01)	X	Define 'aeroplane upset'.	X	X					
(02)		Recognise potential upset 'threats' and suggest effective 'threat management' in scenario situations.	X	X					
(03)		Recognise potential upset 'errors' and suggest effective 'error management' in scenario situations.	X	X					

Syllabus reference	BK	Syllabus details and associated Learning Objectives	Aeroplane		Helicopter			IR	CBIR & EIR
			ATPL	CPL	ATPL /IR	ATPL	CPL		
(04)		Identify a 'developing upset' and describe the required actions to recover in scenario situations.	X	X					
(05)		Explain causes of and contributing factors to upsets.	X	X					
(06)		Review accidents and incidents relating to aeroplane upsets.	X	X					
100 09 00 00		**MENTAL MATHS**							
		Show, in non-calculator tests and/or exercises, the ability in a time-efficient manner to make correct mental calculation approximations:							
(01)		To convert between volumes and masses of fuel using range of units.	X	X	X	X	X		
(02)		For applied questions relating to time, distance and speed.	X	X	X	X	X		
(03)		For applied questions relating to rate of climb or rate of descent, distance and time.	X	X					
(04)		To add or subtract time, distance, and fuel mass in practical situations.	X	X	X	X	X		
(05)		To calculate fuel burn given time and fuel flow in practical situations.	X	X	X	X	X		
(06)		To calculate time available (for decision-making) given extra fuel.	X	X	X	X	X		
(07)		To determine top of descent using a given simple method.	X	X					
(08)		To determine values that vary by a percentage, e.g. dry-to-wet landing distance and fuel burn.	X	X	X	X	X		
(09)		To estimate heights at distances on a 3-degree glideslope.	X	X	X	X	X		
(10)		To estimate headings using the 1-in-60 rule.	X	X	X	X	X		

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(11)		To estimate headwind and crosswind components given wind speed and direction and runway in use.	X	X	X	X	X		

(b) Airship

SYLLABUS OF THEORETICAL KNOWLEDGE FOR CPL AND IR

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