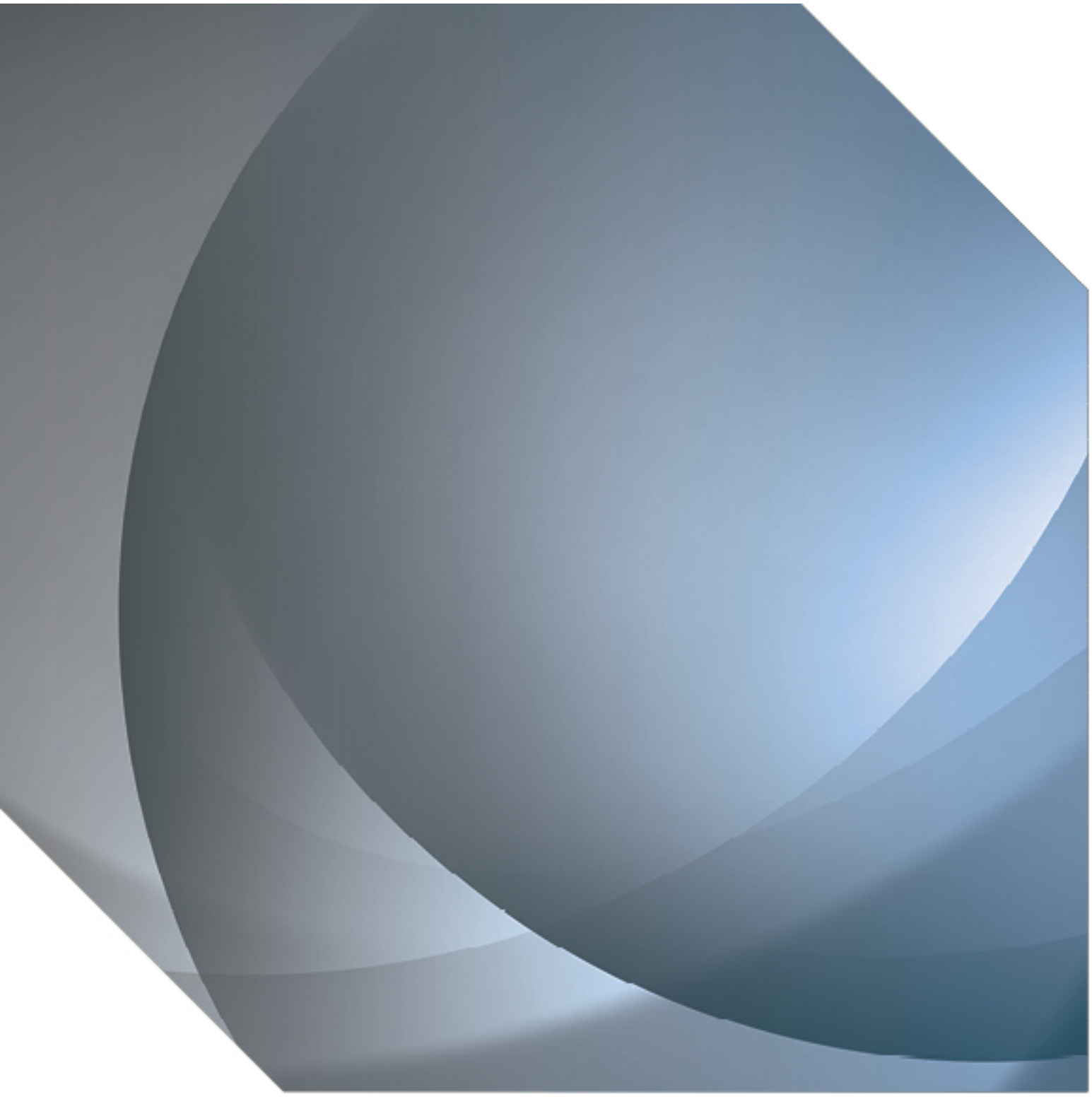
General Aviation Unit

Alternative Means of Compliance 1 FCL115; FCL120 Syllabus of theoretical knowledge for the LAPL(H)

CAP1341



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Introduction

1. In 2014 the CAA's GA Unit worked with a number of fixed and rotary wing senior instructors and examiners, and consulted with a number of training organisations, to devise theoretical knowledge syllabi that is more relevant to today's flight training environment, better meets needs of the students by including modern learning methods and will give pilots the appropriate skills to deal with today's complex aviation environment.

2. The group developed an Alternative Means of Compliance (AltMOC) to the EASA syllabus. All helicopter training organisations that provide LAPL and PPL training were then consulted and invited to comment prior to it being submitted as a formal Alternative Means of Compliance (AltMOC) to EASA.

3. This document sets out an alternative theoretical knowledge syllabus for the EASA LAPL(H).

Guidance to training organisations or facilities

4. The theoretical knowledge training should cover all aspects in an integrated manner, taking into account the particular risks associated with the activity.

5. Training organisation and facilities classroom work can use facilities such as interactive video, slide or tape presentation, computer based training and other media distance learning tools to provide the training courses.

6. The training organisation or facility responsible for the training must ensure that all of the elements of both the theoretical knowledge and flight training have been completed to the required standard before recommending the applicant for an examination or skill test.

7. This document details the Alternative Means of Compliance, training organisations and facilities can choose to adopt for the LAPL(H) course. They can also continue to follow the existing Acceptable Means of Compliance detail in AMC1 FCL.115; 120.

8. It is the intention of the CAA to establish a new set of LAPL and PPL theoretical knowledge examinations for the new syllabi.

Theoretical knowledge syllabus

9. The following tables contain the syllabus for the course of theoretical knowledge for the LAPL (H).

AltMoC 1 FCL.110; FCL.115 – Syllabus of theoretical knowledge for the LAPL(H)

1	**Air law** **International aviation law** International Civil Aviation Organisation (ICAO) European Aviation Safety Agency (EASA) National Aviation Authorities (NAA) **European rules of the air** Applicability and compliance Pilot in command responsibilities Pre flight actions Avoidance of collisions and rights of way Operation in the vicinity of an aerodrome **Aerodromes** Taxiway and runway signs and markings Preventing runway Incursion Other ground signals Marshalling signals Light signals **Visual Meteorological Conditions (VMC) and Visual Flight Rules (VFR)** Visual Meteorological Conditions (VMC) minima Visual Flight Rules (VFR) Minimum heights **Airspace classifications** Classification of airspace Controlled and notified airspace Uncontrolled airspace Radio Mandatory Zones (RMZ) Transponder Mandatory Zones (TMZ) **Altimeter setting procedures** Height, altitude and flight level VFR altimeter setting procedures **Air traffic services** Air Traffic Control Service Flight Information Service Alerting Service **Aeronautical Information Service (AIS)** Aeronautical Information Service (AIS) Aeronautical Information Publication (AIP)

	NOTAMs **Urgency and distress procedures** Urgency situation Distress situation Interception of civil aircraft **Pilot licensing** Medical certificates Private Pilot Licence (PPL) privileges Light Aircraft Pilot Licence (LAPL) privileges Class Rating Type Rating Other Ratings and certificates **National procedures** National rules and procedures
2	**<u>Human performance</u>** **Basic aviation physiology** Hypoxia Hyperventilation Vision and visual illusions Lookout techniques Hearing and balance Spatial disorientation Sleep and fatigue Common ailments, medication, health Toxic hazards Intoxication **Basic aviation psychology** Perception Memory Arousal and performance Stress and stress management Personality types Hazardous attitudes **Principles of Threat and Error Management** Threats Errors Undesired aircraft states Countermeasures Situational awareness Decision making Developing sound judgement

3	**Meteorology** **The atmosphere** Composition of the atmosphere The troposphere **Temperature, pressure and density** Temperature variation in the atmosphere Pressure variation in the atmosphere Density Humidity The International Standard Atmosphere (ISA) **Altimetry** Altimeter and pressure settings Altimeter temperature and pressure effects **Wind** Cause of wind Variation of wind velocity with altitude Local winds **Clouds and precipitation** Formation of cloud Principle cloud types Precipitation **Visibility** Fog and mist Haze and smoke Visibility in precipitation **Air masses** Characteristics of air masses **Low pressure systems** The warm sector depression The warm front The cold front Occluded fronts Troughs and convergence **High pressure systems** Anticyclones Ridges Cols **Hazardous weather conditions: icing** Airframe icing Rain ice

	Frost Piston engine icing **Hazardous weather conditions: thunderstorms** Formation of thunderstorms Hazards for aircraft **Other hazardous weather conditions:** Mountainous areas Turbulence Wind shear Strong winds **Meteorological information** Synoptic charts Satellite imagery Ground based weather radar Area and significant weather forecasts TAFs and METARs Sources of meteorological information Forecast and observation parameters and tolerances **National procedures** National procedures
4	**<u>Communications</u>** **VHF radio broadcast** Factors affecting VHF radio range **Transmission technique** Transmission of letters Transmission of numbers Transmission of time Call signs **VFR communications procedures** Test procedures Standard phraseology Items requiring read back Transfer of communications Transponder operating procedures **Weather information** ATIS & VOLMET broadcasts, Flight Information Service (FIS) **Communications failure** Actions in the event of communication failure **Distress and urgency procedures**

	Emergency frequencies and facilities Urgency procedures Distress procedures **National procedures** National rules and procedures
5	**<u>Principles of flight</u>** **Basic concepts** Static and dynamic pressure Aerodynamic forces Static and dynamic stability **The four forces** Weight Thrust Lift Drag Lift formulae **Aerodynamics of the rotor** Blade pitching, flapping and dragging Blade coning Phase lag Dissymmetry of lift Disc Loading and flare effect Over pitching **Vector diagram depicting forces on the rotor blade including:** (a) Rotors shaft axis & axis of rotation (b) Plane of rotation and tip path plane (c) Induced, rotational and relative airflow (d) Rotor thrust and rotor drag (e) Total reaction **Helicopter flight aerodynamics** Ground effect Tail rotor drift and roll Recirculation Translational lift Flap back Inflow roll Autorotation Vortex ring **Operating limitations** Power required curve for straight and level flight to include: (a) Best RoC, AoC, manoeuvring speeds, V max/min (b) Endurance and range speeds (c) Limited power operations

	Factors affecting the limits to high speed flight to include (a) Structural/engine limitations (b) Compressibility (c) Airflow reversal (d) Retreating blade stall
6	**<u>Operational procedures</u>** **Application of Threat and Error Management (TEM)** Application of Threat and Error Management (TEM) in relation to aircraft operation **Operation of aircraft** Applicability of EASA regulations Responsibility and authority of Pilot in Command (PIC) Documents to be carried Dangerous goods Fuel and oil, refuelling Instruments and equipment Safety equipment **Hazards** Avoiding hazardous situations Avoidance of wake turbulence Effects of Rotor Downwash Avoidance of FOD/'white out'/'brown out' Effects of strong winds/turbulence Mountain/hilly environments Flights over inhospitable terrain Deteriorating Visual Environment (DVE) Rotor RPM decay, low rotor RPM blade stall and overpitching, rotor energy management Low G hazards including mast bumping/tail striking Ground resonance Loss of Tail Rotor Effectiveness (LTE) Dynamic/Static rollover Overspeed of engine/rotors Vortex Ring **Emergency procedures** Forced/Precautionary landing definitions POH/FM Emergency procedures Actions after landing and aircraft evacuation **Search and rescue procedures** Principles of search and rescue procedures Search and rescue signals **Accidents and incidents** Accident definitions and investigation

	Safety reporting Safety publications **Care of passengers** Passenger briefing and passenger procedures **National procedures** National rules and procedures
7	**<u>Flight performance and planning</u>** **Mass and balance** Mass limitations Calculation of aircraft mass Centre of gravity limitations Calculation of centre of gravity **Performance - take-off and climb** Factors affecting take-off & climb performance Calculation of power available and techniques to be used for take-off, hover and climb Height velocity diagram (avoid curve) **Performance – cruise** Principles of endurance and range Factors affecting cruise performance Calculation of cruise performance **Performance - landing** Factors affecting landing performance Calculation of power available and techniques to be used for approach, hover and landing **VFR flight planning** Route selection Chart/map selection Communication and radio navigation selection Completion of the navigation plan The Aeronautical Information Publication (AIP) NOTAMs Obtaining meteorological information International flight **Fuel planning** Fuel required calculation **ICAO (ATS) flight plan** Requirement to file ICAO (ATS) flight plan Submission of the ICAO (ATS) flight plan

	National procedures National rules and procedures
8	**<u>Aircraft general knowledge</u>** **Airframe** Airframe design and construction Serviceability checks **Flying controls** Flying control design and construction Serviceability checks **Landing gear** Landing gear design and construction Serviceability checks **Main and tail rotor systems** Main rotor head and blade, design and construction Tail rotor hub and blade, design and construction Serviceability checks Transmission system Transmission design and construction Serviceability checks **Fuel system** Airframe fuels system design and construction Serviceability checks **Electrical system** Principles of operation Electrical system design and components **Hydraulic system** Principles of operation Hydraulic system design and components **Piston engines** Principles of operation Piston engine design and components Serviceability checks **Turbine engines** Principles of operation Turbine engine design and components Serviceability checks **Engine systems** Fuel system Induction system

	Ignition system Oil system Cooling system Carburettor heating/Anti-ice system Other engine systems **Instruments and systems** The pitot static system The altimeter The vertical speed indicator The air speed indicator Attitude indicator Heading indicator The compass Other instrumentation Integrated electronic displays **Avionics systems** Communications equipment SSR ADF VOR DME GNSS Integrated electronic displays **Cockpit equipment and systems** Doors, windows and exits Seats Seat belts and harnesses Cockpit heating and ventilation systems **Aircraft handling** Aircraft/systems limitations Aircraft/systems handling **Emergency equipment** First aid kit Fire extinguishers ELT/PLB Lifejackets and life rafts Other survival equipment **Aircraft airworthiness** Aircraft registration Airworthiness Certificate, Permit to Fly Aeroplane Flight Manual/Pilot Operating Handbook Aircraft maintenance and serviceability Maintenance and serviceability documentation

	Converting onto a different helicopter type/variant EASA regulations for converting onto a different helicopter type/variant **National procedures** National rules and procedures
9	**<u>Navigation</u>** **Form of the earth** Latitude and longitude **Measurement of direction** True direction Magnetic direction Compass direction **Measurement of distance** Units of distance Conversion of units **Measurement of airspeed** Calculation of true airspeed **Triangle of velocities** Calculating heading and groundspeed **In-flight VFR navigation: dead reckoning and map reading** Principles of dead reckoning Time and distance Map reading **In-flight VFR navigation: off-track and diversion** Off track correction ETA revision Diversion Alternate airfields **In-flight VFR navigation: vertical navigation** Safety altitudes Vertical navigation Altimeter settings **In-flight VFR navigation: controlled and notified airspace** Procedures in the vicinity of controlled and notified airspace Procedures within controlled and notified airspace Airspace infringement **Time** UTC Time zones

	Sunrise and sunset information **VFR radio navigation** Integrating radio navigation with VFR navigation VDF – operation and interpretation, limitations and accuracy ATC radar – operation and interpretation, limitations and accuracy ADF – operation and interpretation, limitations and accuracy VOR – operation and interpretation, limitations and accuracy DME – operation and interpretation, limitations and accuracy GNSS – operation and interpretation, limitations and accuracy

Contact details

Any queries or requests for further guidance by training organisations or facilities should be addressed to your allocated licensing standards inspector.

Alternatively please contact:

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Or e-mail **ga@caa.co.uk**