PBN Syllabus Helicopter		
Training phase	Topic	Learning Objective
Theoretical training	PBN concept (as described in ICAO Doc 9613)	
	PBN principles	List the factors used to define RNAV or RNP system performance requirements (accuracy, integrity, continuity and functionality).
		Explain the concept of continuity.
		Explain the concept of integrity.
		State that, unlike conventional navigation, performance-based navigation is not sensor-specific.
	PBN components	List the components of PBN as NAVAID infrastructure, navigation specification and navigation application.
		Identify the components from an example.
	PBN scope	State that in oceanic/remote, en route and terminal phases of flight PBN is limited to operations with linear lateral performance requirements and time constraints.
		State that in the approach phases of flight PBN accommodates both linear and angular laterally guided operations.
	Navigation specifications	
	RNAV and RNP	State the difference between RNAV and RNP in terms of the requirement for on-board performance monitoring and alerting.
	Navigation functional requirements	List the basic functional requirements of RNAV and RNP specifications (continuous indication of lateral deviation, distance/bearing to active waypoint, g/s or time to active waypoint, navigation data storage and failure indication).
	Designation of RNP and RNAV specifications	Interpret "X" in RNAV X or RNP X as the lateral navigation accuracy (total system error) in nautical miles, which is expected to be achieved at least 95 per cent of the flight time by the population of aircraft operating within the airspace, route or procedure.

		State that aircraft approved to the more stringent accuracy requirements may not necessarily meet some of the functional requirements of the navigation specification having a less stringent accuracy requirement.
		State that RNAV10 and RNP4 are used in the oceanic/remote phase of flight.
		State that RNAV5 is used in the en route and arrival phase of flight.
		State that RNAV2 and RNP2 are also used as navigation specifications.
		State that RNP2 is used in the en route and oceanic/remote phases of flight.
		State that RNAV1 and RNP1 are used in the arrival and departure phases of flight.
		State that RNP APCH is used in the approach phase of flight.
		State that RNP AR APCH is used in the approach phase of flight.
		State that RNP 0.3 navigation specification is used in all phases of flight, except for oceanic/remote and final approach, primarily for helicopters.
	Use of PBN	
	Airspace planning	State that navigation performance is one factor used to determine minimum route spacing.
	Approval	State that the airworthiness approval process assures that each item of the area navigation equipment installed is of a type and design appropriate to its intended function and that the installation functions properly under foreseeable operating conditions.
		State that some PBN specifications require operational approval.
	Specific RNAV and RNP system functions	Recognise the definition of an RF leg.
		Recognise the definition of a fixed radius transition.
		Recognise the definition of a fly-by-turn and a fly-over.
		Recognise the definition of a holding pattern.
		Recognise the definition of an "ARINC 424 path terminator".
		Recognise the definition of the following path terminators: IF, TF, CF, DF, FA, CA.
		Recognise the definition of an offset flight path.
	Data processes	State that the safety of the application is contingent upon the accuracy, resolution and integrity of the data.
		State that the accuracy of the data depends upon the

		processes applied during data origination.
	PBN operations	
	PBN principles	Recognise the definition of path definition error.
		Recognise the definition of flight technical error.
		Recognise the definition of navigation system error.
		Recognise the definition of total system error.
	On-board performance monitoring and alerting	State that on-board performance monitoring and alerting of flight technical error is managed by on-board systems or crew procedures.
		State that on-board performance monitoring and alerting of navigation system error is a requirement of on-board equipment for RNP.
		State that on-board performance monitoring and alerting of path definition error are managed by gross reasonableness checks of navigation data.
	Abnormal situations	State that abnormal and contingency procedures are to be used in case of loss of the PBN capability.
	Database management	State that, unless otherwise specified in operations documentation or AMC, the navigational database must be valid for the current AIRAC cycle.
	Requirements of specific RNAV and RNP specifications	
	RNAV10	State that RNAV10 requires that aircraft operating in oceanic and remote areas be equipped with at least two independent and serviceable LRNSs comprising an INS, an IRS FMS or a GNSS.
		State that aircraft incorporating dual inertial navigation systems (INS) or inertial reference units (IRU) have a standard time limitation.
		State that operators may extend their RNAV10 navigation capability time by updating.
	RNAV5	State that manual data entry is acceptable for RNAV5.
	RNAV/RNP1/2	State that pilots must not fly an RNAV/RNP1/2 SID or STAR unless it is retrievable by route name from the on-board navigation database and conforms to the charted route.
		State that the route may subsequently be modified through the insertion (from the database) or deletion of specific waypoints in response to ATC clearances.
		State that the manual entry, or creation of new waypoints by manual entry, of latitude and longitude

		or place/bearing/ distance values is not permitted.
	RNP4	State that at least two LRNSs, capable of navigating to RNP4 and listed in the flight manual, must be operational at the entry point of the RNP airspace.
	RNP APCH	State that pilots must not fly an RNP APCH unless it is retrievable by procedure name from the on-board navigation database and conforms to the charted procedure.
		State that an RNP APCH to LNAV minima is a non-precision instrument approach procedure designed for 2D approach operations.
		State that an RNP APCH to LNAV/VNAV minima has lateral guidance based on GNSS and vertical guidance based on either SBAS or BaroVNAV.
		State that an RNP APCH to LNAV/VNAV minima may only be conducted with vertical guidance certified for the purpose.
		Explain why an RNP APCH to LNAV/VNAV minima based on BaroVNAV may only be conducted when the aerodrome temperature is within a promulgated range.
		State that the correct altimeter setting is critical for the safe conduct of an RNP APCH using BaroVNAV.
		State that an RNP APCH to LNAV/VNAV minima is a 3D operation.
		State that an RNP APCH to LPV minima is a 3D operation.
		State that RNP APCH to LPV minima requires an FAS data-block.
	RNP AR APCH	State that RNP AR APCH requires authorisation.
	A-RNP	State that Advanced RNP incorporates the navigation specifications RNAV5, RNAV2, RNAV1, RNP2, RNP1 and RNP APCH.
		State that Advanced RNP may be associated with other functional elements.
	PBN Point in Space (PinS) departure	State that a PinS departure is a departure procedure designed for helicopters only.
		State that a PinS departure procedure includes either a "proceed VFR" or a "proceed visually" instruction from landing location to IDF.
		Recognise the differences between "proceed VFR" and "proceed visually" instruction.

	PBN Point in Space (PinS) approach	State that a PinS approach is an instrument RNP APCH procedure designed for helicopters only, and that may be published with LNAV minima or LPV minima.
		State that a PinS approach procedure includes either a "proceed VFR" or a "proceed visually" instruction from the MAPt to a landing location.
		Recognise the differences between "proceed VFR" and "proceed visually" instruction.
Flight instructions	Pre-flight operations and departure	PBN departure (if applicable): Check that the correct procedure has been loaded in the navigation system; and
		Cross-check between the navigation system display and the departure chart.
		Instrument departure procedures, including PBN procedures
	En-route IFR procedures (Must be performed by sole reference to instruments)	Use of navigation system and radio aids
		Tracking, including interception, RNAV
	Arrival procedures	PBN arrival (if applicable): Check that the correct procedure has been loaded in the navigation system; and
		Cross-check between the navigation system display and the arrival chart.
	3D operations (Must be performed by sole reference to instruments)	Setting and checking of navigational aids Check Vertical Path angle for RNP APCH: Check that the correct procedure has been loaded in the navigation system; and
		Cross-check between the navigation system display and the approach chart.
		Approach and landing briefing, including descent/approach/landing checks, including identification of facilities
		Holding procedure
		Compliance with published approach procedure
		Approach timing
		Altitude, speed heading control, (stabilised approach)
		Go-around action
		Missed approach procedure / landing
		ATC liaison — compliance, R/T procedures
		3D operations manually without flight director
		3D operations manually with flight director

	2D operations (Must be performed by sole reference to instruments)	Setting and checking of navigational aids For RNP APCH: Check that the correct procedure has been loaded in the navigation system; and Cross-check between the navigation system display and the approach chart.
		Approach and landing briefing, including descent/approach/landing checks and identification of facilities
		Holding procedure
		Compliance with published approach procedure
		Approach timing
		Altitude, speed, heading control (stabilised approach)
		Go-around action
		Missed approach procedure/landing
		ATC liaison – compliance, R/T procedures