



**GOVERNMENT OF INDIA**

**OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION**

**DRONE TRAINING CIRCULAR 02 OF 2022**

**E-File No. DGCA-31018/3/2022-DRONE-Dte**

**Dated 15 February 2022**

**Subject: Syllabus for training & examination of Remote Pilots**

**1. Introduction**

- 1.1. A Remote Pilot Training organization (RPTO) is required to impart Remote Pilot Training to any individual seeking for a Cat-1 [VLOS] & Cat-2 [BVLOS] Remote Pilot Certificate.
- 1.2. This Circular is issued under the provisions of the Rule 38, 39, 41 and Rule 47 of the Drone Rules, 2021 and Drone Training Circular 01 of 2022.

**2. Applicability**

- 2.1 Applicable for any person intending to become an authorised RPTO to impart Cat-1 [VLOS] Remote Pilot Certificate and Cat-2 [BVLOS] Remote Pilot Certificate Training.
- 2.2 Applicable for any individual to become Remote Pilot of appropriate category.

**3. Minimum Training Syllabus**

**3.1 Ground Class Syllabus**

- Stakeholders & their laws [Basic]
- Air Law/ The Drone Rules 2021
- Airspace
- Basic principles of flight
- ATC procedures & Radio Telephony (non FRTOL)/ ATC procedures Intermediate
- Fixed-wing Operations and Aerodynamics
- Rotorcraft Operations and Aerodynamics
- Hybrid Operations and Aerodynamics
- Weather and Meteorology
- Meteorology Intermediate
- Crew Resource Management
- Instrument Flying
- Weight and Balance
- Performance
- Drone Equipment Maintenance
- Risk Assessment & Analysis - Safety Management/ Emergency Procedures
- Payload, Installation and Utilization
- Intro to Drone Data & Analysis

### 3.2 Flying Class Syllabus

- Flight Simulator Training
- Basic Assembly & Maintenance
- Flight Simulator Instrument Flying
- Dynamic Payload Ground Handling
- Practical Flying with Instructor/ Solo Flying

#### Note :

1. The syllabus specified in the Annexures is the minimum required. RPTO can further increase the duration/syllabus as required based on Class/Category.
2. The Training for Agriculture Use drones shall be in consonance with the SOP issued by Ministry of Agriculture for Drone usage.
3. The requirements for Large class of UAS/ Drones is currently being reserved.

## 4. Cat-1 [VLOS]:

### a. Detailed Syllabus

- Ground Class Syllabus – Annexure – I
- Flying Class Syllabus
  - a) Rotorcraft – Annexure – II
  - b) Hybrid – Annexure – III
  - c) Aeroplane – Annexure – IV
  - d) Combination – Annexure – V

### b. Duration

The duration of the syllabus is broken down as follows:

- a. Theory [Ground Class] – 2 Days
- b. Practical [Flying Class including Simulator] – 3 - 6 Days
- c. Total Cat-1 [Basic] Duration – 5 - 8 Days Approx.

## 5. Cat-2 [BVLOS]:

### a. Detailed Syllabus

- Ground Class Syllabus – Annexure – VI
- Flying Class Syllabus
  - a) Rotorcraft – Annexure – VII
  - b) Hybrid – Annexure – VIII
  - c) Aeroplane – Annexure – IX

### b. Duration

The duration of the Cat-2 [BVLOS] syllabus is broken down as follows:

- a. Theory [Ground Class] – 106 Hours Approx.
- b. Practical [Flying Class including Simulator] – 44 Hours Approx.
- c. Total Cat 2 [BVLOS] Hours – 150 Hours Approx.

## **6. Competency based training & assessment/ examination**

Competency is a dimension of human performance that is used to reliably predict successful performance on the job. A competency is manifested and observed through behaviours that mobilize the relevant knowledge, skills and attitudes to carry out activities or tasks under specified conditions. Training should be so as to focus on competencies. All forms to capture competency and grades based on observable behaviour individually for each manoeuvre and either individually or collectively for scenario elements.

RPTOs are encouraged to develop competency based training programme which enables individuals to reach their highest level of operational capability while ensuring a basic level of competence as a minimum standard. The individual should be geared towards learning rather than passing a test.

The theory teaching methodology can be done physically in classroom or through virtual mode considering the COVID-19 pandemic scenario. RPTO may conduct computer based training [CBT] / e-learning apps for continuous learning and performance improvement.

The examinations should be in an invigilated environment or in an appropriate way to ensure malpractices are ruled out and is ensured that remote pilot capability and attitude is assessed.

The methodology / procedures should be adequately covered in the Training and Procedure Manual (TPM) of the RPTO and the RPTOs should strictly follow for ensuring quality outcome.

## **7. Crediting of RPAS theory & flight time**

Following student remote pilot are entitled to be credited for ground and flying classes:

- a. Cat-1 RePL Holder,
- b. PPL/ CPL Holder,
- c. Military flying experience,
- d. AMEs/Aerospace or Aeronautical Engineers/ Remote Pilots,
- e. ATC controllers/ Flight Operation Personnel

Provided; they take an intake exam or final exam for claiming theory credits. Credits on RPAS flight time may be given provided the logbook along with experience certificate of an acceptable level. In either case, examinations/ skill tests are mandatory.

Sd/-

**(Arun Kumar)**

**(Director General of Civil Aviation)**

GROUND CLASS - SYLLABUS BLOCK (T1)						
Cat 1 [VLOS]		Micro, Small, Medium				
Category		Rotorcraft, Hybrid & Aeroplane				
Limits		VLOS, <400 ft				
Code No	Day No	Number of Classes	Hours	Title of the subject	Sub-titles of the subject	Subject Code
T1.1	Day 01	1	1:30	Stakeholders & their laws [Basic] Drone Rules 2021	International Rules, Regulations, Standards & Practices	T1.1.1
					Civil Aviation Requirements, AIPs, NOTAM	T1.1.5
					Classification & Categorization of drones	T1.1.10
					Type Certification of Drones	T1.1.15
					Registration, Sale & De-Registration of Drones	T1.1.20
					Operations of Drones	T1.1.25
					Dos and Donts	T1.1.30
					Remote Pilot Certificate	1.1.35
					Drone Insurance	1.1.45
T1.2	Day 01	1	1:00	Basic principles of flight	Fundamentals of flight	T1.2.1
					Aerodynamics	T1.2.5
					Take-off, flight, and landing	T1.2.10
					Maneuvers, turns and circuit pattern	T1.2.15
T1.3	Day 01	1	1:15	ATC procedures & Radio Telephony (non FRTOL)	Understanding ATC operations	T1.3.1
					Airspace structure and Airspace	T1.3.5
					Restrictions with knowledge of no drone zones Flight regulations and procedures in Yellow Zone	T1.3.10
					RT Phraseology & Communicating with ATC including Position and Altitude Reporting ;	T1.3.15
					Flight Planning Procedures including Altimeter setting procedures	T1.3.20
					Collision avoidance	T1.3.25
					Radio Telephony (RT) techniques	T1.3.30

T1.4	Day 01	1	1:15	Fixed-wing Operations and Aerodynamics	Types of fixed wing drones, make, parts, terminology	T1.4.1
					Operation and maneuvers of fixed wing drones, Flight Performance	T1.4.5
					Intro to Mission Planning, Instrument Flying & Navigation (GCS)	T1.4.10
					Applications of fixed-wing UAVs	T1.4.15
					Pros and Cons of Fixed Wing Drones	T1.4.20
T1.5	Day 01	1	1:30	Rotorcraft Operations and Aerodynamics	Basic drone terminology & parts	T1.5.1
					Types of drones, material used and size of drones	T1.5.5
					Drone Anatomy: Different parts of drones	T1.5.10
					Avionics & C2 Link	T1.5.15
					Intro to Mission Planning, Instrument Flying & Navigation (GCS)	T1.5.20
					Applications and operations of Multirotor, Flight Performance	T1.5.25
					Pros and Cons of Rotorcraft Drones	T1.5.30
T1.6	Day 01	1	0:30	Hybrid Operations and Aerodynamics	Principles of Aerodynamics	T1.6.1
					Types of Hybrid Drones & Parts	T1.6.5
					Intro to Mission Planning, Instrument Flying & Navigation (GCS)	T1.6.10
					Applications of Hybrid UAVs	T1.6.15
					Comparison with Rotorcraft & Aeroplane	T1.6.20
			<b>7:00</b>			
T1.7	Day 02	1	1:15	Weather and Meteorology	The standard atmosphere	T1.7.1
					Measuring air pressure	T1.7.5
					Heat and temperature	T1.7.10
					Wind	T1.7.15
					Moisture, cloud formation, icing and its effects	T1.7.20
					Effect of atmosphere on RPAS operation & hazardous weather avoidance	1.7.25
					Met Terminal Aviation Routine Weather Report (METAR)	1.7.30
T1.8	Day 02	1	1:30	Drone Equipment Maintenance	Maintenance of drone, flight control box, ground station	T1.8.1

					Maintenance of ground equipment, batteries and payloads	T1.8.5
					Scheduled servicing	T1.8.10
					Repair of equipment	T1.8.15
					Fault finding and rectification	T1.8.20
T1.9	Day 02	1	1:30	Risk Assessment & Analysis - Safety Management / TEM	Drone Emergency & Handling	T1.9.1
					Loss of C2-link	T1.9.5
					Fly-aways (Straying)	T1.9.10
					Loss of power	T1.9.15
					Other Emergencies	T1.9.20
					Control surface failures	T1.9.25
					Human Performance & Pilot Incapacitation	T1.9.30
					Fail-Safe Features	T1.9.35
T1.10	Day 02	1	1:15	Payload, Installation and Utilization	Types of payloads - What to carry , what not to carry	T1.10.1
					Parts of payloads	T1.10.5
					Installation	T1.10.10
					Features of payloads	T1.10.15
					Utilization	T1.10.20
T1.11	Day 02	1	1:30	Intro to Drone Data & Analysis	Principles of Observation	T1.11.1
					Elements of Image & Video Interpretation	T1.11.5
					Introduction to Photogrammetry	T1.11.10
					Types of Image & Video Data	T1.11.15
					Analysis	T1.11.20
			<b>7:00</b>			
T1.12.T	Day 03	1	0:40	Final test - Theory	Written Test (Based on Type of Drone)	

FLYING CLASS - SYLLABUS BLOCK (R1/R2)						
Cat 1 [VLOS]		Micro, Small, Medium				
Category		Rotorcraft				
Limits		VLOS, <400 ft				
Code No	Day No	Number of Exercise	Hours	Title of the subject	Sub-titles of the subject	Subject Code
R1.S, R2.S	Day 03	11	2:45	Flight Simulator Training	Introduction to Flight Simulator	R1.S.1
					Sim familiarization, Controls check	R1.S.2
					Pre-flight checks, Take off, Cruise	R1.S.3
					Approach. Go-around & Landing, Post-Flight Checks	R1.S.4
					Cruise and Turns, Climbing and Climbing Turns	R1.S.5
					Descend & Descending Turns	R1.S.6
					Disorientation & Recovery	R1.S.7
					Circuit Flying – Rectangle/ Square/ Circle / Orbit, Flying – Figure of 8	R1.S.8
					Gimbal Controls (Pan, tilt & zoom)	R1.S.9
					Night Flying	R1.S.10
					Abnormal / Emergency Procedures	R1.S.11
R1.S.T, R2.S.T	Day 03	1	0:15	Flight Simulator Training	<b>Simulator Test</b>	
R1.A, R2.A	Day 03	1	2:00	Basic Assembly & Maintenance	Assembling of drone	R1.A.1
					De-assembling	R1.A.2
					Integration of sub-sections/ modules	R1.A.3
					Integration of engine/propulsion system	R1.A.4
					Fault finding and rectification	R1.A.5
					Repair maintenance and documentation	R1.A.6
R1.F, R2.F	Day 03, 04 & 05	1	4:10	Practical Flying with Instructor/ Solo Flying	Intro to Digital Sky platform	R1.F.1
					RPAS familiarization & Safety briefing	R1.F.2
					Introductory flight where the student experiences sensitivity of controls and learning the orientation of the RPA	R1.F.3
					Take-off, Climbing, descending and maintaining height	R1.F.4
					Basic Controls: Pitch, Roll and Yaw	R1.F.5

					Disorientation & Recovery	R1.F.8
					<b>Progress Check - Multirotor</b>	R1.F.9
					Level turns in both directions	R1.F.10
					Climbing and descending turns	R1.F.11
					Left and right square circuits patterns	R1.F.12
					Flying in circles	R1.F.13
					Flying in figure of 8	R1.F.14
					Mission Planning & Instrument Flying	R1.F.15
					Auto Mission & Flight	R1.F.16
					Night Flying	R1.F.17
					Abnormal/ Emergency procedures	R1.F.18
R1.F.T, R2.F.T	Day 05		0:20		<b>Final Test - Multirotor</b>	



FLYING CLASS - SYLLABUS BLOCK (H1/H2)						
Cat 1 [VLOS]		Micro, Small, Medium				
Category		Hybrid				
Limits		VLOS, <400 ft				
Code No	Day No	Number of Exercise	Hours	Title of the subject	Sub-titles of the subject	Subject Code
H1.S, H2.S	Day 03	11	2:45	Flight Simulator Training	Sim familiarization, Controls check	H1.S.1
					Pre-flight checks, Take off, Transition to Aeroplane	H1.S.2
					Cruise and Turns, Climbing and Climbing Turns	H1.S.3
					Descend & Descending Turns	H1.S.4
					Approach, Transition to Rotorcraft, Landing	H1.S.5
					Hover, Pitch, Roll & Yaw	H1.S.6
					Disorientation & Recovery	H1.S.7
					Circuit Flying	H1.S.8
					Gimbal Controls (Pan, tilt & zoom)	H1.S.9
					Night Flying	H1.S.10
					Abnormal / Emergency Procedures	H1.S.11
H1.S.T, H2.S.T	Day 03	1	0:15		<b>Sim Test</b>	
H1.A, H2.A	Day 03	1	2:00	Basic Assembly & Maintenance	Assembling of drone	H1.A.1
					De-assembling	H1.A.2
					Integration of sub-sections/ modules	H1.A.3
					Integration of engine/propulsion system	H1.A.4
					Fault finding and rectification	H1.A.5
					Repair maintenance and documentation	H1.A.6
H1.F, H2.F	Day 03, 04, & 05	15	4:10	Practical Flying with Instructor/ Solo Flying	Intro to Digital Sky platform	H1.F.1
					GCS Monitoring & Familiarization	H1.F.2
					RPAS Familiarisation & Safety briefing	H1.F.3
					Equipment Setup and Inspection	H1.F.4
					Pre-flight, Controls and Control Surface check	H1.F.5
					Take-off, Climb, Descend and Land	H1.F.6

					Hybrid RPAs Flight Controls	H1.F.7
					Rectangular and other circuit patterns	H1.F.8
					Disorientation & Recovery	H1.F.9
					<b>Progress Check - Hybrid</b>	H1.F.10
					Emergency Handling	H1.F.11
					Mission Planning & Instrument Flying	H1.F.12
					Auto Mission & Flight	H1.F.13
					Night Flying	H1.F.14
					Abnormal/ Emergency procedures	H1.F.15
H1.F.T, H2.F.T	Day 05		0:20		<b>Final Test - Hybrid</b>	

FLYING CLASS - SYLLABUS BLOCK (A1/A2)						
Cat 1 [VLOS]			Micro, Small, Medium			
Category			Aeroplane			
Limits			VLOS, <400 ft			
Code No	Day No	Number of Exercise	Hours	Title of the subject	Sub-titles of the subject	Subject Code
A1.S, A2.S	Day 03	12	4:00	Flight Simulator Training	Introduction to Flight Simulator	A1.S.1
					Sim familiarization, Controls check	A1.S.2
					Pre-flight checks, Ground Man.(If L/G*) Take off, Basic Flight Maneuvers	A1.S.3
					Takeoff -Effect of Torque, Use of Throttle/ Primary flight controls /Flaps	A1.S.4
					Cruise and Turns, Climbing and Climbing Turns Descend & Descending Turns	A1.S.5
					Approach, Landing, Go around/ missed approach (Ground Maneuvers if L/G)	A1.S.6
					Disorientation & Recovery	A1.S.7
					Stalls	A1.S.8
					Circuit Flying, Box Pattern, Holding/ Circle, Figure of 8	A1.S.9
					FPV Flying	A1.S.10
					Night Flying	A1.S.11
					Abnormal / Emergency Procedures	A1.S.12
A1.S.T, A2.S.T	Day 03	1	0:15		<b>Sim Test</b>	
A1.A, A2.A	Day 03	1	2:00	Basic Assembly & Maintenance	Assembling of Aeroplane - Connect Wings, Tail Wings Etc.	A1.A.1
					De-assembling	A1.A.2
					Integration of sub-sections/ modules	A1.A.3
					Integration of engine/propulsion system	A1.A.4
					Fault finding and rectification	A1.A.5
					Repair maintenance and documentation	A1.A.6
A1.F, A2. F	Day 4, 5, 6, 7,8	16	8:50	Practical Flying with Instructor/ Solo Flying	DSP FAM	A1.F.1
					Radio & Field Procedures	A1.F.2
					Aeroplane familiarization & Safety briefing	A1.F.3
					FAM flight where the student experiences sensitivity of controls	A1.F.4

					and learning the orientation of the RPA	
					Basic Flight Maneuvers: Level Flight & Trim (Cruise) Banked Turns Straight Climbs, Climbing Turns Gliding (Idle Power/Descend Turns)	A1.F.5
					Take Off: Effect of Torque, Throttle Management Use of Rudder, (on ground if L/G steering)	A1.F.6
					Go Around / Missed Approach, Procedure Turns	A1.F.7
					Approach. Landings: Slow Flight & Gliding Circuit Pattern Approach & Flare Landing Counter Bounces and Balloons	A1.F.8
					Accuracy Maneuvers : Level Flight Turns to specific headings Power Off (Idle glide) to specific area and altitude	A1.F.9
					Orientation Maneuvers: Disorientation & Recovery Circles Figure of 8 Box Patterns /Circuit Patterns	A1.F.10
					Stalls	A1.F.11
					<b>Progress Check - Aeroplane</b>	A1.F.12
					Mission Planning & Instrument Flying	A1.F.13
					Auto Mission & Flight	A1.F.14
					Night Flying	A1.F.15
					Abnormal/ Emergency procedures	A1.F.16
A1.F.T, A2.F.T	Day 08	1	0:30		<b>Final Test - Aeroplane</b>	

FLYING CLASS - SYLLABUS BLOCK (R1+H1/ R2+H2)						
Cat 1 [VLOS]			Micro, Small, Medium			
Category			Multicopter + Hybrid			
Limits			VLOS, <400 ft			
Code No	Day No	Number of Exercise	Hours	Title of the subject	Sub-titles of the subject	Subject Code
R1H1.S, R2H2.S	Day 03	1	2:30	Flight Simulator Training	Introduction to Flight Simulator	R1H1.S.1, R2H2.S.1
					Sim familiarization, Controls check (Roll, Pitch, Yaw)	R1H1.S.2, R2H2.S.2
					Pre-flight checks, Take off, Cruise	R1H1.S.3, R2H2.S.3
					Approach. Go-around & Landing, Post-Flight Checks	R1H1.S.4, R2H2.S.4
					Cruise and Turns, Climbing and Climbing Turns	R1H1.S.5, R2H2.S.5
					Descend & Descending Turns	R1H1.S.6, R2H2.S.6
					Disorientation & Recovery	R1H1.S.7, R2H2.S.7
					Circuit Flying – Rectangle/ Square/ Circle / Orbit, Flying – Figure of 8	R1H1.S.8, R2H2.S.8
					Gimbal Controls (Pan, tilt & zoom)	R1H1.S.9, R2H2.S.9
					Night Flying	R1H1.S.10, R2H2.S.10
					Abnormal / Emergency Procedures	R1H1.S.11, R2H2.S.11
R1.S.T, R2.S.T	Day 03	1	0:15		<b>Sim Test - Multicopter</b>	
R1H1.S, R2H2.S	Day 03	5	1:15	Flight Simulator Training	Take off, Transition to Aeroplane	R1H1.S.12, R2H2.S.12
					Cruise and Turns, Climbing and Climbing Turns	R1H1.S.13, R2H2.S.13
					Approach, Transition to Rotorcraft, Landing	R1H1.S.14, R2H2.S.14
					Night Flying	R1H1.S.15, R2H2.S.15
					Abnormal / Emergency Procedures	R1H1.S.16, R2H2.S.16
H1.S.T, H2.S.T	Day 03	1	0:15		<b>Sim Test - Hybrid</b>	
R1H1.A, R2H2.A	Day 03	1	2:00	Basic Assembly & Maintenance	Assembling of drone	R1H1.A.1, R2H2.A.1
					De-assembling	R1H1.A.2, R2H2.A.2

					Integration of sub-sections/ modules	R1H1.A.3, R2H2.A.3
					Integration of engine/propulsion system	R1H1.A.4, R2H2.A.4
					Fault finding and rectification	R1H1.A.5, R2H2.A.5
					Repair maintenance and documentation	R1H1.A.6, R2H2.A.6
R1H1.F, R2H2.F	Day 03, 04, 05	14	3:30	Practical Flying with Instructor/ Solo Flying	Intro to Digital Sky Platform	R1H1.F.1, R2H2.F.1
					RPAS Familiarization - Multirotor	R1H1.F.2, R2H2.F.2
					Take-off, Climb, Descend and Land	R1H1.F.3, R2H2.F.3
					Basic Controls: Pitching, Rolling and Yawing	R1H1.F.4, R2H2.F.4
					Rectangular and other patterns	R1H1.F.5, R2H2.F.5
					Disorientation & Recovery	R1H1.F.6, R2H2.F.6
					<b>Progress Check - Multirotor</b>	R1H1.F.7, R2H2.F.7
					Flying in circles, Figure of 8	R1H1.F.8, R2H2.F.8
					Night Flying	R1H1.F.9, R2H2.F.9
					GCS Familiarisation	R1H1.F.10, R2H2.F.10
					Mission Planning - Multirotor	R1H1.F.11, R2H2.F.11
					Instrument Flying & Navigation Aids	R1H1.F.12, R2H2.F.12
					Auto Mission & Flight	R1H1.F.13, R2H2.F.13
					Abnormal/ Emergency procedures	R1H1.F.14, R2H2.F.14
R1.F.T, R2.F.T	Day 05	1	0:20		<b>Final Test - Multirotor</b>	
R1H1.F, R2H2.F	Day 05, 06 & 07	10	2:30	Practical Flying with Instructor/ Solo Flying	RPAS Familiarization - Hybrid	R1H1.F.15, R2H2.F.15
					Equipment Setup and Inspection	R1H1.F.16, R2H2.F.16
					Pre-Flight, Controls and control surface check	R1H1.F.17, R2H2.F.17
					Take-Off, Climb, Descend and Land	R1H1.F.18, R2H2.F.18
					Rolling, Pitching and Yawing	R1H1.F.19, R2H2.F.19
					<b>Progress Check - Hybrid</b>	R1H1.F.20, R2H2.F.20
					Mission Planning - Hybrid	R1H1.F.21, R2H2.F.21
					Auto Mission & Flight	R1H1.F.22, R2H2.F.22

					Abnormal/ Emergency procedures	R1H1.F.23, R2H2.F.23
					Night Flying	R1H1.F.24, R2H2.F.24
H1.F.T, H2.F.T	Day 07	1	0:20		<b>Final Test - Hybrid</b>	

## Annexure-VI

GROUND CLASS - BLOCK SYLLABUS (T2)					
Cat 2 [BVLOS]	Micro, Small, Medium				
Category	Rotorcraft, Hybrid & Aeroplane				
Limits	BVLOS, <400 ft, >400 ft, All Zones, Day and Night, Fixed and Dynamic Payload				
Code No	Number of Classes	Hours	Title of the subject	Sub-titles of the subject	Subject Code
T1.1	1	01:30	Stakeholders & their laws [Basic] Drone Rules 2021	International Rules, Regulations, Standards & Practices	T1.1.1
				Civil Aviation Requirements, AIPs, NOTAM	T1.1.5
				Classification & Categorization of drones	T1.1.10
				Type Certification of Drones	T1.1.15
				Registration, Sale & De-Registration of Drones	T1.1.20
				Operations of Drones	T1.1.25
				Dos and Don'ts	T1.1.30
				Remote Pilot Certificate	T1.1.35
				Drone Insurance	T1.1.45
T2.1	5	10:00	Air Law	Introduction to Manned Aircraft Regulations	T2.1.1
				Navigation Lights, Strobe Lights etc	T2.1.5
				Right of way, emergency light symbols, non RT emergency procedures	T2.1.10
T2.2.T	1	01:00	Test - Theory	Air Law	
T2.3	3	05:00	Airspace	Airspace Maps (Controlled airspace, VFR Sectional, IFR Charts)	T2.3.1
				Flight regulations and procedures in Yellow Zone	T2.3.5
				Flight regulations and procedures in Red Zone	T2.3.10
T2.4.T	1	01:00	Test - Theory	Airspace	
T1.2	1	01:00	Basic principles of flight	Fundamentals of flight	T1.2.1
				Aerodynamics	T1.2.5
				Take-off, flight, and landing	T1.2.10
				Manoeuvres, turns and circuit pattern	T1.2.15
T1.3	1	01:00	ATC procedures & Radio Telephony (non FRTOL)	Understanding ATC operations	T1.3.1
				Airspace structure and Airspace	T1.3.5
				Restrictions with knowledge of no drone zones	T1.3.10



				RT Phraseology & Communicating with ATC including Position and Altitude Reporting ;	T1.3.15
				Flight Planning Procedures including Altimeter setting procedures	T1.3.20
				Collision avoidance	T1.3.25
				Radio Telephony (RT) techniques	T1.3.30
T2.5	6	16:00	ATC procedures Intermediate	RT Communication Channels ( + SATCOM)	T2.5.1
				Separation procedures	T2.5.5
				BVLOS RT techniques	T2.5.10
				Yellow Zone RT techniques	T2.5.15
				Red Zone RT techniques	T2.5.20
				Emergency RT Procedures	T2.5.25
T2.6.T	1	01:00	Test - Theory	ATC procedures Intermediate	
T1.4	1	01:30	Fixed-wing Operations and Aerodynamics	Types of fixed wing drones, make, parts, terminology	T1.4.1
				Operation and manoeuvres of fixed wing drones, Flight Performance	T1.4.5
				Intro to Mission Planning, Instrument Flying & Navigation (GCS)	T1.4.10
				Applications of fixed-wing UAVs	T1.4.15
				Pros and Cons of Fixed Wing Drones	T1.4.20
T1.5	1	01:30	Rotorcraft Operations and Aerodynamics	Basic drone terminology & parts	T1.5.1
				Types of drones, material used and size of drones	T1.5.5
				Drone Anatomy: Different parts of drones	T1.5.10
				Avionics & C2 Link	T1.5.15
				Intro to Mission Planning, Instrument Flying & Navigation (GCS)	T1.5.20
				Applications and operations of Rotorcraft, Flight Performance	T1.5.25
				Pros and Cons of Rotorcraft Drones	T1.5.30
T1.6	1	00:30	Hybrid Operations and Aerodynamics	Principles of Aerodynamics	T1.6.1
				Types of Hybrid Drones & Parts	T1.6.5
				Intro to Mission Planning, Instrument Flying & Navigation (GCS)	T1.6.10
				Applications of Hybrid UAVs	T1.6.15
				Comparison with Rotorcraft & Aeroplane	T1.6.20
T1.7	1	01:15	Weather and Meteorology	The standard atmosphere	T1.7.1
				Measuring air pressure	T1.7.5
				Heat and temperature	T1.7.10
				Wind	T1.7.15
				Moisture, cloud formation, icing and its effects	T1.7.20

				Effect of atmosphere on RPAS operation & hazardous weather avoidance	1.7.25
				Met Terminal Aviation Routine Weather Report (METAR)	1.7.30
T2.7	7	15:00	Meteorology Intermediate	Mountain weather	T2.7.1
				Weather over water bodies	T2.7.5
				Winds Aloft	T2.7.10
				Route Climatology	T2.7.15
				Significant Weather and Wind Charts	T2.7.20
				Meteorological Information for Aircraft in Flight	T2.7.25
				Flight into known extreme weather	T2.7.30
T2.8	7	05:00	Crew Resource Management	Human Performance and Limitations	T2.8.1
				Cognition in Aviation	T2.8.5
				Communication and Cooperation	T2.8.10
				Crew Decision-Making	T2.8.15
				Delegation of duties	T2.8.20
				Risk, Accountability and Responsibility	T2.8.25
Multi-crew Operations	T2.8.30				
T2.9.T	1	01:00	Test - Theory	Meteorology Intermediate + Crew Resource Management	
T2.10	9	15:00	Instrument Flying	Mission Planning	T2.10.1
				BVLOS Instruments	T2.10.5
				Instrument Flight Procedures	T2.10.10
				Instrument Landing	T2.10.15
				Instrument Takeoff	T2.10.20
				Instrument Minimums/Maximums	T2.10.25
				PIC Minimums/Maximums	T2.10.30
				Detect and Avoid (ADS-B IN, UTM)	T2.10.35
Drone Ports, Landing Pads, Drone Strips	T2.10.40				
T2.11.T	1	01:00	Test - Theory	Instrument Flying	
T2.12	4	05:00	Weight and Balance	Centre of Gravity Limits	T2.12.1
				Flight Weight (Fixed)	T2.12.5
				Flight Weight (Dynamic)	T2.12.10
				Performance (Climb, Descend, Straight and Level, Endurance etc.)	T2.12.15
T2.13	6	10:00	Performance	Effects of Density Altitude, Pressure Altitude	T2.13.1
				Effects of Payload Power Draw	T2.13.5
				Effects on Engine/Battery Performance	T2.13.10
				Effects of Takeoff Weight	T2.13.15
				Performance (Climb, Descend, Straight and Level etc.)	T2.13.20

				RF Range Management (fresnel zone, RF interference etc.)	T2.13.25
T1.8	1	01:30	Drone Equipment Maintenance	Maintenance of drone, flight control box, ground station	T1.8.1
				Maintenance of ground equipment, batteries and payloads	T1.8.5
				Scheduled servicing	T1.8.10
				Repair of equipment	T1.8.15
				Fault finding and rectification	T1.8.20
T1.9	1	01:30	Risk Assessment & Analysis - Safety Management / TEM	Drone Emergency & Handling	T1.9.1
				Loss of C2-link	T1.9.5
				Fly-aways (Straying)	T1.9.10
				Loss of power	T1.9.15
				Other Emergencies	T1.9.20
				Control surface failures	T1.9.25
				Human Performance & Pilot Incapacitation	T1.9.30
				Fail-Safe Features	T1.9.35
T2.14	5	05:00	Emergency Procedures	Instrument Stall detection and recovery	T2.14.1
				Low Rotor RPM and Rotor Stall	T2.14.5
				Autorotation, Vortex Ring State	T2.14.10
				Retreating Blade Stall, Ground Resonance	T2.14.15
				Instrument Failsafe procedures	T2.14.20
				Instrument Emergency Procedures	T2.14.25
				Payload Emergency Procedures	T2.14.30
				Decision Making and Risk	T2.14.35
				Incident Reporting	T2.14.40
				Emergency Response Plan	T2.14.45
T1.10	1	01:15	Payload, Installation and Utilization	Types of payloads - What to carry , what not to carry	T1.10.1
				Parts of payloads	T1.10.5
				Installation	T1.10.10
				Features of payloads	T1.10.15
				Utilization	T1.10.20
T1.11	1	01:30	Intro to Drone Data & Analysis	Principles of Observation	T1.11.1
				Elements of Image & Video Interpretation	T1.11.5
				Introduction to Photogrammetry	T1.11.10
				Types of Image & Video Data	T1.11.15
				Analysis	T1.11.20
T1.12.T	1	00:40	Final test - Theory	Written Test (Based on Type of Drone)	
T2.15.T	1	01:00	Test - Theory	Weight and Balance + Performance + Emergency Procedures	

**Annexure-VII**

FLYING CLASS - BLOCK SYLLABUS (R4/ R5/R6)					
<b>Cat 2 [BVLOS]</b>	<b>Micro, Small, Medium</b>				
<b>Category</b>	<b>Rotorcraft</b>				
<b>Limits</b>	<b>BVLOS, &lt;400 ft, &gt;400 ft, All Zones, Day and Night, Fixed and Dynamic Payload</b>				
Code No	Number of Classes	Hours	Title of the subject	Sub-titles of the subject	Subject Code
R1.S, R2.S	11	02:45	Flight Simulator Training	Introduction to Flight Simulator	R1.S.1
				Sim familiarization, Controls check	R1.S.2
				Pre-flight checks, Take off, Cruise	R1.S.3
				Approach. Go-around & Landing, Post-Flight Checks	R1.S.4
				Cruise and Turns, Climbing and Climbing Turns	R1.S.5
				Descend & Descending Turns	R1.S.6
				Disorientation & Recovery	R1.S.7
				Circuit Flying – Rectangle/ Square/ Circle / Orbit, Flying – Figure of 8	R1.S.8
				Gimbal Controls (Pan, tilt & zoom)	R1.S.9
				Night Flying	R1.S.10
				Abnormal / Emergency Procedures	R1.S.11
R1.S.T, R2.S.T	1	00:15	Flight Simulator Training	<b>Simulator Test</b>	
R1.A, R2.A	1	02:00	Basic Assembly & Maintenance	Assembling of drone	R1.A.1
				De-assembling	R1.A.2
				Integration of sub-sections/ modules	R1.A.3
				Integration of engine/propulsion system	R1.A.4
				Fault finding and rectification	R1.A.5
				Repair maintenance and documentation	R1.A.6
R1.F, R2.F	15	04:10	Practical Flying with Instructor/ Solo Flying	Intro to Digital Sky platform	R1.F.1
				RPAS familiarization & Safety briefing	R1.F.2
				Introductory flight where the student experiences sensitivity of controls and learning the orientation of the RPA	R1.F.3
				Take-off, Climbing, descending and maintaining height	R1.F.4
				Basic Controls: Pitch, Roll and Yaw	R1.F.5

				Disorientation & Recovery	R1.F.8
				<b>Progress Check - Rotorcraft</b>	R1.F.9
				Level turns in both directions	R1.F.10
				Climbing and descending turns	R1.F.11
				Left and right square circuits patterns	R1.F.12
				Flying in circles	R1.F.13
				Flying in figure of 8	R1.F.14
				Mission Planning & Instrument Flying	R1.F.15
				Auto Mission & Flight	R1.F.16
				Night Flying	R1.F.17
				Abnormal/ Emergency procedures	R1.F.18
R1.F.T, R2.F.T		00:20		<b>Final Test - Rotorcraft</b>	
R4.S, R5.S, R6.S	8	12:00	Flight Simulator Instrument Flying	Mission Planning	R4.S.1
				Pre-flight checks, Take off, Cruise	R4.S.2
				Approach. Go-around & Landing, Post-Flight Checks	R4.S.3
				Cruise and Turns, Climbing and Climbing Turns	R4.S.4
				Descend & Descending Turns	R4.S.5
				Disorientation & Recovery	R4.S.6
				Circuit Flying – Rectangle/ Square/ Circle / Orbit, Flying – Figure of 8	R4.S.7
				Abnormal / Emergency Procedures	R4.S.8
R4.S.P.T, R5.S.P.T, R6.S.P.T	1	01:00	Flight Simulator Instrument Flying	<b>Instrument Flying Simulator Flight Planning Test</b>	
R4.S.F.T, R5.S.F.T, R6.S.F.T	1	00:45	Flight Simulator Instrument Flying	<b>Instrument Flying Simulator Flying Test</b>	
R4.G, R5.G, R6.G	3	04:00	Dynamic Payload Ground Handling	Payload Mounting/Dismounting	R4.G.1
				Centre of Gravity limits	R4.G.2
				Safety Checks	R4.G.3
R4.F, R5.F, R6.F	20	15:00	Practical Flying with Instructor/ Solo Flying CAT 2	Level flight: straight-and-level; timed turns (standard-rate)	R4.F.1
				Level flight: straight-and-level; timed turns (standard rate); racetrack holding pattern	R4.F.2
				Level flight: straight-and-level; procedure turn; teardrop turn; racetrack pattern. Constant speed; all turns standard rate;	R4.F.3
				Climbs/descents at normal airspeeds	R4.F.4
				Climbs/descents at specific airspeeds	R4.F.5
				Vertical S's at specific airspeeds	R4.F.6
				Climbs/descents/turns with airspeed changes and configuration change	R4.F.7

				S-turns across a cardinal heading with configuration changes and heading changes	R4.F.8
				Manoeuvring for approach, missed approach, upset recovery and recovery	R4.F.9
				Instrument Landing	R4.F.10
				Instrument Takeoff	R4.F.11
				Dynamic payload management and performance	R4.F.12
				<b>Progress Check - Rotorcraft</b>	R4.F.13
				Low Rotor RPM and Rotor Stall	R4.F.14
				Autorotation, Vortex Ring State	R4.F.15
				Retreating Blade Stall, Ground Resonance	R4.F.16
				Instrument Failsafe procedures	R4.F.17
				Instrument Emergency Procedures	R4.F.18
				Payload Emergency Procedures	R4.F.19
				Flight Procedures in Yellow and Red Zone (including RT)	
				Night Flying	R4.F.20
R4.F.T, R5.F.T, R6.F.T		01:45		<b>Final Test - Rotorcraft CAT 2 (15 minutes night)</b>	

**Annexure-VIII**

FLYING CLASS - BLOCK SYLLABUS (H4/ H5/ H6)					
<b>Cat 2 [BVLOS]</b>	<b>Micro, Small, Medium</b>				
<b>Category</b>	<b>Hybrid</b>				
<b>Limits</b>	<b>BVLOS, &lt;400 ft, &gt;400 ft, All Zones, Day and Night, Fixed and Dynamic Payload</b>				
<b>Code No</b>	<b>Number of Classes</b>	<b>Hours</b>	<b>Title of the subject</b>	<b>Sub-titles of the subject</b>	<b>Subject Code</b>
H1.S, H2.S	11	02:45	Flight Simulator Training	Sim familiarization, Controls check	H1.S.1
				Pre-flight checks, Take off, Transition to Aeroplane	H1.S.2
				Cruise and Turns, Climbing and Climbing Turns	H1.S.3
				Descend & Descending Turns	H1.S.4
				Approach, Transition to Rotorcraft, Landing	H1.S.5
				Hover, Pitch, Roll & Yaw	H1.S.6
				Disorientation & Recovery	H1.S.7
				Circuit Flying	H1.S.8
				Gimbal Controls (Pan, tilt & zoom)	H1.S.9
				Night Flying	H1.S.10
				Abnormal / Emergency Procedures	H1.S.11
H1.S.T, H2.S.T	1	00:15	Flight Simulator Training	<b>Simulator Test</b>	
H1.A, H2.A	1	02:00	Basic Assembly & Maintenance	Assembling of drone	H1.A.1
				De-assembling	H1.A.2
				Integration of sub-sections/ modules	H1.A.3
				Integration of engine/propulsion system	H1.A.4
				Fault finding and rectification	H1.A.5
				Repair maintenance and documentation	H1.A.6
H1.F, H2.F	15	04:10	Practical Flying with Instructor/ Solo Flying	Intro to Digital Sky platform	H1.F.1
				GCS Monitoring & Familiarization	H1.F.2
				RPAS Familiarisation & Safety briefing	H1.F.3
				Equipment Setup and Inspection	H1.F.4
				Pre-flight, Controls and Control Surface check	H1.F.5
				Take-off, Climb, Descend and Land	H1.F.6
				Hybrid RPAs Flight Controls	H1.F.7
				Rectangular and other circuit patterns	H1.F.8

				Disorientation & Recovery	H1.F.9
				<b>Progress Check - Hybrid</b>	H1.F.10
				Emergency Handling	H1.F.11
				Mission Planning & Instrument Flying	H1.F.12
				Auto Mission & Flight	H1.F.13
				Night Flying	H1.F.14
				Abnormal/ Emergency procedures	H1.F.15
H1.F.T, H2.F.T		00:20		<b>Final Test - Hybrid</b>	
H4.S, H5.S, H6.S	8	12:00	Flight Simulator Instrument Flying	Mission Planning	H4.S.1
				Pre-flight checks, Take off, Cruise	H4.S.2
				Approach. Go-around & Landing, Post-Flight Checks	H4.S.3
				Cruise and Turns, Climbing and Climbing Turns	H4.S.4
				Descend & Descending Turns	H4.S.5
				Disorientation & Recovery	H4.S.6
				Circuit Flying – Rectangle/ Square/ Circle / Orbit, Flying – Figure of 8	H4.S.7
				Abnormal / Emergency Procedures	H4.S.8
H4.S.P.T, H5.S.P.T, H6.S.P.T	1	01:00	Flight Simulator Instrument Flying	<b>Instrument Flying Simulator Flight Planning Test</b>	
H4.S.F.T, H5.S.F.T, H6.S.F.T	1	00:45	Flight Simulator Instrument Flying	<b>Instrument Flying Simulator Flying Test</b>	
H4.G, H5.G, H6.G	3	04:00	Dynamic Payload Ground Handling	Payload Mounting/Dismounting	H4.G.1
				Centre of Gravity limits	H4.G.2
				Safety Checks	H4.G.3
H4.F, H5.F, H6.F	22	15:00	Practical Flying with Instructor/ Solo Flying CAT 2	Level flight: straight-and-level; timed turns (standard-rate)	H4.F.1
				Level flight: straight-and-level; timed turns (standard rate); racetrack holding pattern	H4.F.2
				Level flight: straight-and-level; procedure turn; teardrop turn; racetrack pattern. Constant speed; all turns standard rate;	H4.F.3
				Climbs/descents at normal airspeeds	H4.F.4
				Climbs/descents at specific airspeeds	H4.F.5
				Transition Flight Maneuvers	H4.F.6
				Vertical S's at specific airspeeds	H4.F.7
				Climbs/descents/turns with airspeed changes and configuration change	H4.F.8
				S-turns across a cardinal heading with configuration changes and heading changes	H4.F.9
				Manoeuvring for approach, missed approach	H4.F.10



				Instrument Landing	H4.F.11
				Instrument Takeoff	H4.F.12
				Dynamic payload management and performance	H4.F.13
				<b>Progress Check - Hybrid</b>	H4.F.14
				Instrument Stall detection and recovery	H4.F.15
				Low Rotor RPM and Rotor Stall	H4.F.16
				Autorotation, Vortex Ring State	H4.F.17
				Retreating Blade Stall, Ground Resonance	H4.F.18
				Instrument Failsafe procedures	H4.F.19
				Instrument Emergency Procedures	H4.F.20
				Payload Emergency Procedures	H4.F.21
				Flight Procedures in Yellow and Red Zone (including RT)	H4.F.22
H4.F.T, H5.F.T, H6.F.T		01:45		<b>Final Test - Hybrid CAT 2 (15 minutes night)</b>	

## Annexure-IX

FLYING CLASS - BLOCK SYLLABUS (A4/A5/A6)					
<b>Cat 2 [BVLOS]</b>	<b>Micro, Small, Medium</b>				
<b>Category</b>	<b>Aeroplane</b>				
<b>Limits</b>	<b>BVLOS, &lt;400 ft, &gt;400 ft, All Zones, Day and Night, Fixed and Dynamic Payload</b>				
Code No	Number of Classes	Hours	Title of the subject	Sub-titles of the subject	Subject Code
A1.S, A2.S	12	04:00	Flight Simulator Training	Introduction to Flight Simulator	A1.S.1
				Sim familiarization, Controls check	A1.S.2
				Pre-flight checks, Ground Man.(If L/G*) Take off, Basic Flight Manoeuvres	A1.S.3
				Takeoff -Effect of Torque, Use of Throttle/ Primary flight controls /Flaps	A1.S.4
				Cruise and Turns, Climbing and Climbing Turns Descend & Descending Turns	A1.S.5
				Approach, Landing, Go around/ missed approach (Ground Manoeuvres if L/G)	A1.S.6
				Disorientation & Recovery	A1.S.7
				Stalls	A1.S.8
				Circuit Flying, Box Pattern, Holding/ Circle, Figure of 8	A1.S.9
				FPV Flying	A1.S.10
				Night Flying	A1.S.11
				Abnormal / Emergency Procedures	A1.S.12
A1.S.T, A2.S.T	1	00:15		<b>Sim Test</b>	
A1.A, A2.A	1	02:00	Basic Assembly & Maintenance	Assembling of Aeroplane - Connect Wings, Tail Wings Etc.	A1.A.1
				De-assembling	A1.A.2
				Integration of sub-sections/ modules	A1.A.3
				Integration of engine/propulsion system	A1.A.4
				Fault finding and rectification	A1.A.5
				Repair maintenance and documentation	A1.A.6
A1.F, A2. F	16	08:50	Practical Flying with Instructor/ Solo Flying	DSP FAM	A1.F.1
				Radio & Field Procedures	A1.F.2
				Aeroplane familiarization & Safety briefing	A1.F.3

				FAM flight where the student experiences sensitivity of controls and learning the orientation of the RPA	A1.F.4
				Basic Flight Manoeuvres: Level Flight & Trim (Cruise) Banked Turns Straight Climbs, Climbing Turns Gliding (Idle Power/Descend Turns)	A1.F.5
				Take Off: Effect of Torque, Throttle Management Use of Rudder, (on ground if L/G steering)	A1.F.6
				Go Around / Missed Approach, Procedure Turns	A1.F.7
				Approach. Landings: Slow Flight & Gliding Circuit Pattern Approach & Flare Landing Counter Bounces and Balloons	A1.F.8
				Accuracy Manoeuvres : Level Flight Turns to specific headings Power Off (Idle glide) to specific area and altitude	A1.F.9
				Orientation Manoeuvres: Disorientation & Recovery Circles Figure of 8 Box Patterns /Circuit Patterns	A1.F.10
				Stalls	A1.F.11
				<b>Progress Check - Aeroplane</b>	A1.F.12
				Mission Planning & Instrument Flying	A1.F.13
				Auto Mission & Flight	A1.F.14
				Night Flying	A1.F.15
				Abnormal/ Emergency procedures	A1.F.16
A1.F.T, A2.F.T	1	00:30		<b>Final Test - Aeroplane</b>	
A4.S, A5.S, A6.S	8	12:00	Flight Simulator Instrument Flying	Mission Planning	A4.S.1
				Pre-flight checks, Take off, Cruise	A4.S.2
				Approach. Go-around & Landing, Post-Flight Checks	A4.S.3
				Cruise and Turns, Climbing and Climbing Turns	A4.S.4
				Descend & Descending Turns	A4.S.5
				Disorientation & Recovery	A4.S.6
				Circuit Flying – Rectangle/ Square/ Circle / Orbit, Flying – Figure of 8	A4.S.7
				Abnormal / Emergency Procedures	A4.S.8
A4.S.P.T, A5.S.P.T, A6.S.P.T	1	01:00	Flight Simulator Instrument Flying	<b>Instrument Flying Simulator Flight Planning Test</b>	

A4.S.F.T, A5.S.F.T, A6.S.F.T	1	00:45	Flight Simulator Instrument Flying	<b>Instrument Flying Simulator Flying Test</b>	
A4.G, A5.G, A6.G	3	04:00	Dynamic Payload Ground Handling	Payload Mounting/Dismounting	A4.G.1
				Centre of Gravity limits	A4.G.2
				Safety Checks	A4.G.3
A4.F, A5.F, A6.F	18	15:00	Practical Flying with Instructor/ Solo Flying CAT 2	Level flight: straight-and-level; timed turns (standard-rate)	A4.F.1
				Level flight: straight-and-level; timed turns (standard rate); racetrack holding pattern	A4.F.2
				Level flight: straight-and-level; procedure turn; teardrop turn; racetrack pattern. Constant speed; all turns standard rate;	A4.F.3
				Climbs/descents at normal airspeeds	A4.F.4
				Climbs/descents at specific airspeeds	A4.F.5
				Vertical S's at specific airspeeds	A4.F.6
				Climbs/descents/turns with airspeed changes and configuration change	A4.F.7
				S-turns across a cardinal heading with configuration changes and heading changes	A4.F.8
				Manoeuvring for approach, missed approach	A4.F.9
				Instrument Landing	A4.F.10
				Instrument Takeoff	A4.F.11
				Dynamic payload management and performance	A4.F.12
				<b>Progress Check - Aeroplane</b>	A4.F.13
				Instrument Stall detection and recovery	A4.F.14
				Instrument Failsafe procedures	A4.F.15
				Instrument Emergency Procedures	A4.F.16
				Payload Emergency Procedures	A4.F.17
				Flight Procedures in Yellow and Red Zone (including RT)	A4.F.18
A4.F.T, A5.F.T, A6.F.T		01:45		<b>Final Test - Aeroplane CAT 2 (15 minutes night)</b>	