Syllabus for Drone RPC, Anti-Drone & Drone Forensics

Duration:- 02 Weeks

1. RPC (Remote Pilot Course) :

S.No.	Topic	Description	Period
1.	T1.1 Stakeholders & Their Laws (Basic) Drone Rules 2021	International Rules, Regulations ,Standards & Practices, Civil Aviation Requirements, AIPs, NOTAM ,Classification & Categorization of Drones, Type Certification of Drones ,Registration ,Sale & De-Registration of Drones, Operations of Drones, Do's and Don'ts, Remote Pilot Certificate and Drone Insurance.	1 Hrs. 30 Min.
2.	T1.2 Basic Principles of Flight	Fundamentals of Flight, Aerodynamics, Take-off ,Flight ,and Landing, Maneuvers ,turns and circuit pattern.	1 Hrs.
3.	T1.3 ATC Procedures & Radio Telephony (non FRTOL)	Understanding ATC Operations, Airspace Structure and Airspace, Restrictions with Knowledge of No Drone Zones Flight Regulations and Procedure in Yellow Zone, RT Phraseology & Communicating with ATC including Position and Altitude Reporting, Flight Planning Procedures Including Altimeter setting Procedures Collision avoidance and Radio Telephony(RT) Techniques.	1 Hrs. 20 Min.
4.	T1.4 Fixed Wing Operations and Aerodynamics	Types of Fixed Wing Drones, Make, Parts and Terminology, Operation and Maneuvers of Fixed Wing Drones, Flight Performance, Intro to Mission Planning, Instrument Flying & Navigation (GCS), Applications of Fixed Wing UAVs and Pros and Cons of Fixed Wing Drones.	1 Hrs. 15 Min.
5.	T1.5 Rotorcraft Operations and Aerodynamics-	Basic Drone Terminology & Parts, Types of Drones , Material used and Size of Drones, Drone Anatomy: Different Parts of Drones, Avionics&C2 Link, Intro to Mission Planning, Instrument Flying & Navigation (GCS), Applications and Operations of Multirotor, Flight Performance and Pros and Cons of Rotorcraft Drones.	1 Hrs. 30 Min.
6.	T1.6 Hybrid Operations and Aerodynamics	Principles of Aerodynamics, Type of Hybrid Drones & Parts, Intro to Mission Planning, Instrument Flying & Navigation (GCS), Applications of Hybrid UAVs and Comparison with Rotorcraft & Aeroplane.	30 Min.
7.	T1.7 Weather and Meteorology	The Standard Atmosphere, Measuring Air Pressure , Heat and Temperature, Wind, Moisture , Cloud Formation, Icing and Its Effects, Effect of Atmosphere on RPAS & Hazardous Weather Avoidance and Met Terminal Aviation Routine Weather Report (METAR).	1 Hrs. 15 Min.
8.	T1.8 Drone Equipment Maintenance	Maintenance of Drone ,Flight Control Box, Ground Station, Maintenance Of Ground Equipment , Batteries and Payloads, Scheduled Servicing, Repair of Equipment and Fault Finding and Rectification.	1 Hrs. 30 Min.
9.	T1.9 Risk Assessment & Analysis – Safety management/TEM	Drone Emergency & Handling, Loss of C2 Link, Fly-aways (Straying), Loss of Power, Other Emergencies, Control Surface Failure, Human Performance & Pilot Incapacitation and Fail-Safe Features.	1 Hrs. 30Min.

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10.	T1.10 Payload, Installation and Utilization	Types of Payloads–What to Carry, What not to Carry , Parts of Payloads, Installation, Features of Payloads and Utilization.	1Hrs. 15Min.
11.	T1.11 Intro to Drone Data & Analysis	Elements of Image & Video Interpretation , Introduction to Photogrammetry and Types of Image & Video Data Analysis .	1Hrs. 30Min.
12.	T1.12.T Final Test Theory	Written Test	40Min.

2. Simulator Practice :

S.No.	Topic	Description	Period
13.	R1.S, R2.S Flight Simulator Training	Introduction to Flight Simulator, Sim Familiarization, Control Check, Pre-flight Checks, Takeoff, Cruise, Approach, Go-around & Landing, Post-flight Checks, Cruise and Turns, Climbing and Climbing Turns, Descend & Descending Turns, Disorientation & Recovery, Circuit Flying– Rectangle/Square/Circle/Orbit, Flying– Figureof8, Gimbal Controls (Pan, Tilt & Zoom), Night Flying, Abnormal/Emergency Procedures R1.S, R2.S Flight Simulator Training Total - No. Of Exercise-11	2 Hrs. 45 Min.
14.	R1.S, R2.S Flight Simulator Training & R1.S.T, R2.S.T	Simulator Test	15 Min.

3. MRO (Workshop) :

S.No.	Topic	Description	Period
15.	MRO/Workshop	R1.A, R2.A Basic Assembly & Maintenance- Assembling of Drone , De-assembling , Integration of Sub-sections/ Modules , Integration of Engine/ Propulsion System , Fault Finding and Rectification, and Repair, Maintenance and Documentation.	2 Hrs.

4. Drone Flying :

S.No.	Topic	Description	Period
16.	R1.F, R2.F Practical flying with Instructor/Solo Flying	Intro to Digital Sky Platform , RPAS Familiarization & Safety Briefing , Introductory Flight Where the Student Experiences Sensitivity of Controls and Learning the Orientation of the RPA, Take-off, Climbing, Descending And Maintaining Height, Basic Controls: Pitch, Roll, and Yaw, Disorientation & Recovery, Progress Check- Multirotor, Level Turns in both Directions, Climbing and Descending Turns, Left and Right Square Circuits Patterns, Flying in Circle ,Flying in Figureof8, Mission Planning & Instrument Flying, Auto Mission & Flight, Night Flying, and Abnormal/Emergency Procedure.	4 Hrs. 10 Min.
17.	R1.F.T, R2.F.T Flying Exam	Flying Exam	20Min.

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5. Anti-Drone & Drone Forensics:

S.No.	Topic	Description	Period
18	Drone Warfare & Security Risks	Global threat analysis including Russia-Ukraine War and Middle East conflict zones, surveillance drones, weaponized drones (IED payloads), narcotics/arms smuggling drones, swarm attack theory, DIY modified commercial drones, threat classification matrix	3 Hrs.
19	Communication & Navigation Systems	RF communication protocols (2.4 GHz, 5.8 GHz, LTE/5G), telemetry systems, GNSS architecture including Global Positioning System, GLONASS, NavIC, satellite vulnerabilities (jamming/spoofing), autonomous vs manual control	3 Hrs.
20	Drone Detection Technologies	Micro-Doppler radar (bird vs drone differentiation), passive RF spectrum monitoring, acoustic detection systems, EO/IR (optical & thermal cameras), AI-based object recognition, multi-sensor data fusion, urban detection challenges	3 Hrs.
21	Anti-Drone Neutralization (Soft & Hard Kill)	Soft kill: RF jamming, GNSS spoofing (meaconing), protocol hijacking, geo-fencing exploitation. Hard kill: directed energy weapons (laser/microwave), kinetic interceptors (anti-drone guns, nets), kill-chain concept (Detect–Track–Identify–Neutralize)	3 Hrs.
22	Drone Forensics & Digital Investigation	Crash site management, drone hardware analysis (flight controller, ESC, payload), data extraction (SD cards, logs), pilot identification (home-point reconstruction), payload forensics, chain of custody, forensic tools/software	3 Hrs.
23	Legal Framework & Compliance	Indian drone regulations by Directorate General of Civil Aviation (DGCA), drone rules, no-fly zones, licensing (UIN/UAOP), privacy laws, legal admissibility of evidence, global regulatory overview	3 Hrs.
24	Tactics, SOPs & Deployment	VIP security, critical infrastructure protection (airports, power plants), urban vs border deployment strategies, police SOPs, anti-drone deployment planning, threat assessment models	3 Hrs.
25	Simulation, Field Training & Exercises	Live simulation drills, mock drone attack scenarios, red team vs blue team exercises, tracking & neutralization practice, field equipment handling, incident response rehearsal	4 Hrs.
26	Cyber security & Counter-UAV Hacking	Drone firmware vulnerabilities, RF protocol exploitation, ethical UAV hacking, cyber takeover techniques (controlled), anti-jamming resilience	3 Hrs.
27	Emerging Technologies & Future Trends	AI-powered drones, swarm intelligence, counter-drone AI systems, satellite-based tracking, integration with smart policing & defence systems	3 Hrs.
28	Assessment & Certification	Written test (40 min), practical evaluation (detection & neutralization), viva / scenario-based assessment	40 Min.

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