## **RULE BOOK**

# 4.RC Plane

### TASK:

Demonstrate take-off, flight, and landing within a specific area, aerobatic manoeuvres (loops, rolls, stalls, etc.). Navigate through a series of waypoints or obstacles and test endurance with long-duration flights or payload carrying.

#### **General Guidelines:**

- Participants must bring their own RC aircraft and necessary equipment.
- Each team must design and operate a radio-controlled (RC) aircraft following the design constraints.
- The goal is to maximize payload capacity relative to aircraft weight and successfully deliver it to a designated area.
- Weight balls (50g, 45mm diameter) will be provided as payloads by the organizers.
- The competition consists of two rounds:
- Qualifier Round Selects the top teams.
- Main Round Determines the top three teams.
- The arena will be an open ground.
- The same aircraft must be used in both rounds. Repairs are allowed but no aircraft replacement.
- Teams should carry extra components (motors, batteries, propellers, etc.) to avoid lastminute issues.
- Each team must have 2 to 4 members.
- Only students can participate, and school/college ID cards are required.
- Multiple teams from the same institution must ensure a minimum 2.5% difference in wingspan, chord, and fuselage length.
- Teams violating design differentiation rules will be disqualified.
- 2.4 GHz radios are required for all aircraft. If using a different frequency, teams must inform organizers.
- Receivers must be in "receiver mode only".
- Metal propellers are not allowed.
- Organizers will inspect all systems (servos, motors, etc.). If any system is nonfunctional, the team will be disqualified.
- Sharing aircraft components (motors, ESCs, batteries, etc.) between teams is prohibited.

#### **Design Specifications**

• The aircraft must be a Fixed-Wing RC aircraft.

- Ready-to-fly (RTF), Almost-Ready-to-Fly (ARF), and Bind-N-Fly (BNF) models are prohibited.
- Maximum aircraft weight (without payload): 1 kg.
- Maximum propeller diameter: 13 inches.
- Maximum wingspan: 1.2m.
- Only electric motors are allowed (Internal Combustion engines and other propulsion methods are prohibited).
- Gyroscopes (gyros) and programming assistance in receivers are not allowed.
- Autonomous or programmed flight is prohibited.
- FPV (First-Person View) and external flight assistance are not allowed.
- Aircraft can have either:
- Powered take off with landing gear.
- Manual launch by a team member at ground level.

#### Judging Criteria

#### A. Qualifier Round

Objective:

Aircraft must demonstrate strong payload-carrying capability and safe flight. **Rules**:

- The aircraft must carry the payload for at least 30 seconds.
- The payload must be inside the aircraft, not exposed externally.
- Judges must inspect and approve the payload mounting before takeoff.
- Each attempt must be completed within 3 minutes (from takeoff to landing).
- Scoring Formula:
- Score = (Weight of Payload Carried ×100 / Weight of Aircraft without Payload)
- Score =( Weight of Aircraft without Payload / Weight of Payload Carried × 100)
- Aircraft that fail to fly for 30 seconds will receive a score of zero.
- Each team gets two attempts, and the best score is considered.
- Top teams qualify for the Main Round based on their score.

#### **B. Main Round**

Objective:

Aircraft must carry and drop payloads into a 20m diameter circular drop zone. Rules:

- The payload must be dropped after at least 30 seconds of flight post-take off.
- All payloads must be released in a single drop.
- Not allowed:
- Sticking payloads together.
- Dropping a box containing multiple payloads.
- The payload must be released using only one transmitter channel.
- The drop zone is 40m from the take off/landing zone.

- Scoring Formula:
- Score = (Weight of Payload Dropped in Zone × 100 / Weight of Aircraft without Payload)
- Score = (Weight of Aircraft without Payload / Weight of Payload Dropped in Zone × 100)
  - Each team gets two attempts, and the best score is considered.
  - Each attempt must be completed within 4 minutes (from take off to landing).
  - Final Score Calculation:
- Final Score =  $(0.25 \times \text{Score in Qualifier Round}) + (0.75 \times \text{Score in Main Round})$
- Final Score= $(0.25 \times \text{Score in Qualifier Round}) + (0.75 \times \text{Score in Main Round})$
- The top three teams with the highest Final Score will be the winners.
- In case of a tie, a tiebreaker round will be conducted as per judges' decision. Judges' decisions are final.

#### Safety Rules

- Flying outside the designated zone results in disqualification.
- If a pilot flies over the event organizing area, they must immediately turn back and land safely.
- The take off and drop zones may be adjusted based on ground and wind conditions.
- Timer Regulations:
- The next team's timer starts 60 seconds after the previous attempt ends.
- Teams must be ready to launch within this time.
- Failure to launch on time results in forfeiting the attempt.

#### > Notes

- All updates or changes to the competition rules will be communicated via registered email.
- Updates will also be posted on the technical festival website.