



Drone racing
Rules and regulations

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Rules and Regulations

The rules and regulations will be mainly based on safety and providing a level footing for all teams involved. They are intentionally not over restrictive in the interest of promoting creativity and ingenuity. Although liberal, the rules below must be strictly adhered to. Disregard for these rules will likely result in team disqualification.

**All areas marked critical must be followed or instant disqualification may occur.*

P3.1 Layout of Competition:

Stage 1:

- Portfolio submission (max 260 points)

Stage 2: National event

- Portfolio (max 300 points)
- Verbal presentation and Q & A (max 200 points)
- Engineering (max 300 points)
- Race (max 240 points)

Total number of points available- 1300 points

P3.2 Equipment:

The following will be supplied by Syndic8 to each team so that there is an equal footing throughout the competition. **These are critical items and must be used.**

- Radio controller (Tx)
- Radio receiver (Rx)
- Flight controller (FC)
- Video transmitter (VTx)
- Certified LiPo battery

P4.1 Drone Regulations:

- The maximum weight (including battery) of your drone cannot exceed 999g. **(critical)**
- The maximum square frame width of your drone cannot exceed 300mm in either direction. **(critical)**
- The maximum frame height of your drone cannot exceed 100mm. **(critical)**
- There is no restriction on the type of material used, but it should be structurally adequate not to pose a safety hazard. **(critical)**
- The maximum propeller size cannot exceed 6". **(critical)**
- Component antennas cannot extend more than 120mm outside of the drone frame boundaries. **(critical)**

P4.2 Radio Frequencies:

- The radio controller and receiver provided use a frequency of 2.4GHz.
- The video transmitter provided uses a frequency of 5.8GHz.
- The power output of the video transmitter cannot exceed 25mW.

P4.3 End of year event:

- You may only enter 1 drone in the end of year event. This drone must take part in all competitions.
- Repair of broken components is allowed, but must be conducted in the designated repair zone.
- Propellers can be changed at any time. There are no restrictions other than size on the type of propellers used.
- Drones can only be powered on in designated areas, and only when told to do so.
- Battery charging is only permitted in the designated battery re-charging zone.
- All teams are responsible for the safekeeping of their own equipment. Do not leave valuable equipment unattended.
- At no time will you intentionally interfere with competing teams or their equipment, during events or at any other instance. **(critical)**
- Teams must conduct themselves with a good sporting behaviour.
- Make sure to pre-programme the 5.8GHz video frequency allocated to your team before attending the end of year event.

Stage 1:

P5.1 Portfolio submission and 3D STEP file: 260 points

The portfolio should include an insight into your drone and how it was completed. The steps in completing it and how it was designed from start to finish. Images will also enhance this. The portfolio should be no longer than 20 pages (1 cover page and 19 pages of content). It should look professional and pleasing to the eye. Teams will also receive feedback on this to help improve portfolios for the National event.

This Portfolio shows the research gone into planning the drone, how you will make and assemble components. **The key difference in the stage 1 portfolio and the portfolio for the National finals is that this is about the planning before construction, detailing the techniques that will be used and detailing any problems that might arise and how they could be solved.**

A 3D STEP file must also be submitted in the following format:

A folder with two sub-folders inside.

The First folder called "Parts" will contain the STEP file of all the different components made for the drone, which will be assessed.

The second folder called "Assembled Drone" will contain a STEP file with the fully assembled 3D model of the drone, which will show the design of Drone. This will also aid with showing the overall size of the drone. Feedback will be given as to any rules broken related to size of the drone, so they may be altered when the National finals begin.

An email link will be added to the website closer to the deadline where the Portfolio and 3D STEP file will be uploaded.

Marking Scheme: Stage 1

P6.1 Portfolio submission and 3D STEP file

Topic:	Points (260)
Overall portfolio:	60
max 20 pages limit	20
Professional/ eye catching	20
Easy to navigate	10
Images	10
Investigation and Research:	200
Seeking out new technologies	30
Design techniques	30
Research into manufacturing techniques	30
Research into electrical techniques	30
Research into material	50
3D STEP file of Drone	30

Stage 2: National Finals

P 7.1 Portfolio: 300 points

The portfolio should include an insight into your drone and how it was completed. The steps in completing it and how it was designed from start to finish. Images will also enhance this. The portfolio should be no longer than 20 pages (1 cover page and 19 pages of content). It should look professional and pleasing to the eye. A hard copy is required for the National event. Points will be rewarded on improvements made from submission in stage 1. The portfolio will contain research into the drone and images on your team completing it through the different stages. The Portfolio should be a representation of your work over the course of the year showing what your team completed together.

P7.2 Verbal presentation and Q & A: 200 points

This is the presentation of your Drone and portfolio. You will discuss how you made your Drone, tested, and improved it to get to this stage. Professionalism will also be a part of the grading system. You will then engage in a question and answer section where judges can ask questions based on the presentation, allowing you both to engage in dialogue. Questions on the use of the forum on the website will also be a part of the grading system. Teams who use the forum in the best way will score higher.

P7.3 Engineering: 300 points

There is a huge significance and weighting on this section. This section involves the making of your drone. You will need to show how you constructed it, investigation and research into programming, aerodynamics, and design, etc. CAM 3D models are needed to show your design of drone. A working drawing showing all sizes is also needed to show judges that they meet the criteria.

P7.4 Race: 240 points

You will have to fly your drone through LED hoops on a designed track from start to finish. To achieve top marks, you will need to be fast through the hoops without crashing. A 3D model of the track will be released shortly before the competition to allow teams to construct easily from material from local hardware store to practice on. Another part to the race category is the last drone standing competition. You will be required to keep your drone hovering for as long as possible until the battery runs out. The last drone hovering gets 40 points.

Marking Scheme: Stage 2

P8.1 Portfolio

Topic:	Points (300)
Overall portfolio:	100
max 20 pages limit	20
Professional/ eye catching	20
Easy to navigate	10
Images	10
Improvements/alterations on portfolio submission	40
Investigation and Research:	200
Seeking out new technologies	30
Design techniques	30
Research into manufacturing techniques	30
Research into electrical techniques	30
Research into material	50
Development of drone	30

P8.2 Verbal presentation and Q & A

Topic:	Points (200)
Clear, concise vocal presentation	20
Good, clear explanations	40
Answering of questions asked	50
Use of forum	40
Professional looking team	30
Overall presentation	20

P9.1 Engineering

Topic:	Points (300)
Design:	130
CAM 3D models	50
Working drawing	30
Aerodynamics	20
Design process	20
Overall appearance	10
Manufacture:	170
max weight 999g (critical)	20
max height 100mm (critical)	20
max frame length 300mm in either direction (critical)	20
max propeller size 6" (critical)	20
max antenna length outside of frame 120mm (critical)	20
Structurally safe (critical)	20
Accurate copy of working drawing	30
Materials used	10
Joining techniques/ methods	10

P9.2 Race

Topic: Each team will race four times for a max point total of 200	Points (240)
Stage A	(200)
1 st place	50
2 nd place	40
3 rd place	30
4 th place	20
5 th place	10
Stage B	(40)
Last drone standing	40