ScrapBot Olympics – 2024 Ruleset

## **A) The Robot**

1. **Size Limit**
   1. The robot must fit within W250 x D250 x H150mm cuboid, this is in all configurations.
   2. Any decorative parts (e.g., feathers, string etc. may be allowed to overhang these dimensions providing they are not functional).
2. **Mass Limit**
   1. The robot must not exceed a mass of 1000g in its heaviest configuration.
   2. A tolerance of 1% will be applied in case of scale inaccuracy (i.e., a measurement of 1010g is within tolerance, whereas 1011g is not).
3. **Adaptations / Interchangeable parts**
   1. Robots are permitted to swap parts and configurations between disciplines.
   2. Swapping of parts is prohibited for:

* Batteries (competition batteries will be supplied by UEA on the day)
* Microcontroller
* Radio chip
* Motor driver
* Motors
  1. For the disciplines that have multiple rounds, the same configuration must be used for each round (repair/replacement of damaged adaptations between rounds is permitted).
  2. All interchangeable parts or adaptations must not change the core structure or base function of the robot. If unsure, ask the event organiser prior to the event.

1. **Power and Safety**
   1. All robots must use the batteries provided by UEA during the competition:
      1. 1 x 9V battery (the controller).
      2. 1x 2S 500mAhr LiPo (for the robot).

--- During development (off UEA site) you may use batteries standard PP3 9V batteries ---

* 1. Robots must have a main power switch with an indicator light to show when the robot is active (supplied in the kit):
     1. The light must be mounted to be highly visible.
     2. The power switch must be mounted for easy access.
     3. Both switch and light will be provided in the kit, failure to use them correctly could result in point deduction penalties.
     4. Additional lighting is permitted so long as it is only on when the whole robot is powered on (i.e., not externally powered, secondary battery or powered by bypassing the main power switch).

1. **Design and Build**
   1. Sharp edges on the external surfaces of robots are prohibited.
   2. The chassis must be made of recycled materials (i.e., tin cans, cereal boxes, thick cardboard, etc.).
      1. Custom parts are permitted (e.g., 3D printed / laser cut parts) providing they do not make up the majority of the robot. Table 5.2.1 below, offers some practical clarification of 3D / laser cutting applications. If not specified to be permitted, assume it is prohibited; border cases to be assessed by the discretion of the judges.

**Table A5.2.1: Exemplar applications of digital manufacturing techniques**.

|  |  |
| --- | --- |
| **Permitted** | **Prohibited** |
| Brackets (motor, electronics, shell-to-chassis, etc.) | Unibody designs (e.g., monocoques) |
| Decorations (consuming the minority of the external shell) | Majority chassis structures |
| Wheel hub(s) (connects drive shaft to wheel) | Majority shells |
|  | Wheels |
|  | Tyres |
|  | Servo driven end effector |

* + 1. Fixings do not have to be recycled
* Recommended fixings include hot glue, split pins, staples, etc.
  1. Decorations are encouraged (Especially googly eyes and fur)
* Points are not awarded for design-aesthetic but they will contribute to the enjoyment of the day.

# B) The Competition

1. **Personal Conduct**
   1. Any verbal or physical abuse to any other person will not be tolerated whether they are on the same team or not.
   2. All members of a team must be from the same organisation.
   3. The recommended team size for the competition is 3-5 students, plus a responsible adult.

* More participants are welcome to help the design and build process but will not be accommodated on the day of the competition.
  1. You are permitted to help other teams.
  2. You are **not** permitted to sabotage or in any way damage another team’s robot.
  3. Support of your team (cheering, clapping etc.) is encouraged so long as it does not cause a disturbance to other teams.

1. **Poster**
   1. The poster has equal points weighting to an active event.
   2. Posters are to be provided in .pdf format by email to [c.dowding@uea.ac.uk](mailto:c.dowding@uea.ac.uk) 5 working days ahead of the event, using the email subject line ‘SCRAPBOT POSTER’.

* Failure to submit on time precludes poster participation.
  1. Posters should be A3 Portrait format.
  2. Minimum font size 14, non-serifed font.
  3. UEA will print and laminate posters, awaiting your arrival at the event.
  4. Posters should explain and describe **[Marked out of 100]** the following criteria:
     1. **Team name, team members, host school, and robot name [10 Points].**
     2. **Design Objectives** **[20 Points]** (what qualities did you want your robot to have? Why?).
     3. **Design process [25 Points]** (How did you go about moving from a pile of electronic bits supplied by UEA to a moving and fighting ScrapBot? How was this process informed by your objectives?).
     4. **Material sourcing [25 Points]:**
        1. Show evidence that you used reclaimed materials.
        2. Give a simple costing to demonstrate your low-cost ethos (you should indicate if donations of materials were made).
     5. **Reflections** **[20 Points]** (what would you change to improve?).

1. **General Event Rules**
   1. Each team should come up with a team name and a robot name:

* Offensive or derogatory language will not be tolerated.
* Puns are encouraged.
  1. During 1 vs. 1 events, the teams of the active robots must not obstruct the view or interfere with the opposing team’s controller.
  2. Only the robots may interact with each other during an event:
     1. Pushing, shoving, pulling etc. are encouraged.
     2. If a robot is overturned, the round will be paused for the upturned robot to be righted and the round will resume within the remaining time.
  3. The robots may not release a smoke flare or attempt any other means of obscuring view.
  4. The teams or robots may not electronically “jam” the signal to any of the other robots.

1. **The Games**
   1. There will be 5 disciplines:
      1. ScrapBot Team Poster

See Section B2 for full details.

* + 1. ScrapBot Assault Course (single player – time challenge)

Navigate a predefined route around and/or over a succession of terrain. You get one practice run and one timed run.

* + 1. ScrapBot Pinball (single player – point challenge)

Collate points for completing challenges within an allotted time. You get one shot at this challenge.

* + 1. ScrapBot Hungry Hippos (multiplayer)

Collect more tokens than your opponent(s) within an allotted time. Your robot must compete in multiple rounds.

* + 1. ScrapBot Sumo (multiplayer)

Push your opponent out of the ring. Your robot must compete in multiple rounds.

* 1. Multiplayer events will be competed on a tournament basis.
  2. Single player events will be competed on a schedule.
  3. The ScrapBot Olympics is a league-based competition, where points accrued by performance in the ‘disciplines’ (See section B4.1) count towards an overall league position.