

Burnout

BURNOUT is an RC car-racing event conducted by BITS-Pilani, Goa Campus during their annual 3-day techno-managerial festival called Quark.

Burnout 2017 will have an all-terrain track consisting of wood, grass and mud. It will be both on road and off road. Here, both speed and control are important as the track has biting turns, cross bumps and rough covers.

The race details are as follows:

1. The width of the track will be around 2 m
2. A control stand will be provided along the track for the driver to position himself to control his vehicle during the run. The height of the stand will be around 8 feet. The controlling of machine has to be done from this stand only.
3. 3-7 cars will be racing on the tracks at the same time and try to surpass the opponent's car while maintaining its stability.
4. If the organizers are convinced that a team is trying to harm the opponent's car, the respective team will be disqualified.
5. A lap of the track is completed when the car comes back to the finish.
6. If a vehicle becomes immobilized during the course of a race, the corresponding team will have to forfeit that particular round.
7. Checkpoints will be arranged throughout the track. In case of a human intervention during the course of a race, the car will have to restart the race from the previous checkpoint.

Burnout

Event Structure –

Round 1: Qualifiers

Time trial: Teams will have to complete the track in the least time duration possible. Each team will get a maximum of three tries, out of which the best one will decide their position on the qualifying chart. The teams will be arranged in the decreasing order of their race times and the top eight teams will qualify to the next round.

Round 2: Face-off

Knockout: Teams qualifying to the second round will race one-on-one as decided by the event managers. The winners will pass on to the final round. Round 2 will have three laps in succession.

Round 3: Finals

All teams qualifying to the finals will race against each other. This round will also have three laps.

Burnout

Track Composition

The track will mostly be on grass, with intermediate sections on asphalt/dirt. There will be wooden obstacles like planks, loops, banks etc., which the cars will have to surpass. The track boundaries will be made from either rubber tires or thick heavy ropes, fastened down on poles.

Judging Criteria

All rounds will be judged either on the basis of finishing position or the race duration. All decisions of the event managers will be final and binding.

Trailblazers

Trailblazers is an RC plane flying competition. It is open for all aerodynamics lovers - both students professionals. This competition will consist of 3 rounds which will test your designing and flying skills. Designing a balanced plane is important as all 3 rounds are of different types. To participate in this competition participants have to bring a plane built from scratch and meeting the constraints mentioned for each round. Each team can have a maximum of four members.

3 rounds as mentioned above are

- Manoeuvres
- Drag race
- Stunts and passes

Round 1 Manoeuvres (Day 1)

This would be the first round of the competition. In this round, the plane will be tested according to the constraints mentioned below. The flyer has to fly the plane through a series of hoops, positioned to test his manoeuvre skills.

Marking scheme

The marking will be done on both the time taken and the total number of hoops passed successfully. For every successful pass the team gets 20 points and on finishing, an additional

$1/(\text{time taken (mins)}) * 200 \text{ points}$

Trailblazers

Additional Instructions

- The thrust to weight ratio of the plane should be 1:1 or less.
- It is not mandatory to cover every hoop; points will be awarded only for the successful passes.
- A proper balance between the total points obtained from hoops, and finishing the race will be ensured during the event.

Round 2 Drag Race (Day 2)

The name itself says about the round. In this round every plane will have to cover a simple path in the minimum time possible. Points will be awarded according to the ranking in the race. There are no constraints except that the flyer has to use the same plane for all 3 rounds (changing wing is not allowed). The marking will be relative: 200 points for the 1st and 0 for last, on a linear basis.

Bonus Round (Day 2)

Low pass : This round is optional. Planes need to come as low as possible. The closer it comes to ground the better is the low pass. Only two attempts are allowed and the flyer must intimate the event managers/judges before performing a low pass. The marking will be the same manner as above but maximum points will be 100.

Trailblazers

Round 3 Acrobatics. (Day 3)

In this round, flyers will have to perform 3 - 4 acrobatic moves from a list of 6 pre-defined stunts. In this round, timeouts are allowed (optional) between each stunt performed. The flyer or his teammate has to intimate the event managers/judges before performing any stunt. Every successful stunt earns the team 75 points.

The list of stunts:

- Cuban 8 :- 5/8s of a loop to the 45 degree line, 1/2 roll, 3/4s of a loop to the 45 degree line, 1/2 roll, 1/8s of a loop to level flight (half of the Cuban Eight is called a "half Cuban Eight", and the figure can be flown backwards, known as a "Reverse Cuban Eight").
- Immelmann turn:-1/2 looping up followed by half a roll. There should be no pause between the end of the looping section and the start of the roll to erect flight.
- Bell tail side: - 1/4 looping up, straight vertical (full power) until the aircraft loses momentum. The aircraft falls backwards, tail first, until the nose drops through the horizon to a vertical down position. 1/4 loop (push or pull) to recover to level flight.
- Stall turn or hammerhead:- 1/4 loop (pull or push) to vertical, as momentum/airspeed decreases, rudder is applied and the aircraft rotates around its yaw axis, the nose falls through the horizon and points towards the ground, a momentary pause is made to draw the vertical down line, and 1/4 loop to level flight. This figure is sometimes called a *stall turn* which is a misnomer because the aircraft never actually stalls.

Trailblazers

- Split S:-Essentially an Immelmann in reverse. Half roll (from erect to inverted) followed by positive pitch to give a half loop. Converts altitude to airspeed, and reverses direction.
- Rolling loop :- in involves 3 roll in a inner or outer loop 1 before start next in mid of loop(bottom or top of loop)and third immediately at the end of loop

General rules

- The arena provided will be an open field of approximately 50m radius.
- Teams can have a maximum of four members.
- Planes should be electrically powered. No other fuel is allowed.
- No ready to assemble planes are allowed.
- Tech supports for minor defects can be provided, depending on the judge's decision.
- For round 1 the constraints mentioned should be fulfilled. If thrust is to weight ratio is greater than one weights will be added at the C.G of the plane to balance, which can lead to decrease in performance of the plane.
- Teams have to come up with a design which can perform better for all the rounds as no change of parts is allowed for different rounds.
- Decisions of the judges will be final in every case.
- If you are participating in any other events then your timings can be adjusted.
- Changes in schedule can be made depending on weather condition or time availability.

Mortar Kombat

Task:

Design and build a spud gun. Use it to compete in different challenges, adhering to the rules and regulations of the game.

Model Specifications:

- You may use a spud gun made of PVC, built from scratch by your team and bring it during the event.
- Use of metallic pipes are prohibited.
- Your gun should work using electric sparks for ignition of the gas chamber.
- You should not use LPG, CNG, vaporized fossil fuels for aiding the ignition of gas chamber. Deodorant and perfumes are allowed.
- Your gun should use paper, potato, or clothes only as ammo.
- Decide the dimensions of your spud gun keeping in mind the arena and rules of various rounds.
- Your team must consist of maximum 5 members.
- Maximum length of the spud gun should be 3 meters.

Mortar Kombat

Event Structure:

- The event consists of three rounds. Teams qualifying in a round will progress to subsequent rounds.
- The rounds have been designed to accommodate every aspect needed to build a spud gun like design and accuracy.

Round 1:

Objective: Shoot a stationary target above the ground.

Task:

- Use the spud gun designed by your team to shoot a target kept at a height of about 10 meters above the ground.
- The target will be a square with concentric circles on it.
- Hitting the innermost circle will fetch most points and the outermost carries the least.
- Not hitting the target will get zero points.

Maximum number of shots - 3

Time limit – 2 minutes per shot

Mortar Kombat

Points:

- Point for this round will be given based on your accuracy.
- Innermost circle: 100 points
- Middle circle: 70 points
- Outermost Circle: 50 points
- Outside all circles, but within the square: 30 points.
- Hitting the circumference of any circle will fetch the points for the outer one.
- Points achieved from each shot will be added to the total points.

Round 2:

Objective: Shoot the targets kept on the ground at different levels. Points vary from target to target.

Task:

- The targets will be arranged in three levels in the form of an equilateral triangle with the apex facing away from you.
- Farther the target, more the points.
- Targets along the same level will have the same points.
- There are no restrictions on the number of shots in this round. The teams can shoot as many times they need in the prescribed time limit.

Time limit – 6 minutes

Mortar Kombat

Points:

- First level carry 50 points
- Second level carry 100 points
- Third level carry 200 points.
- Points achieved from each shot will be added to the total points.

Round 3 Final Round:

Objective: Shoot a moving target suspended from a height.

Task:

- Use the spud gun designed by your team to shoot a target suspended from a height of about 10 meters above the ground.
- The target will have concentric circles on it.
- Hitting the innermost circle will fetch most points and the outermost carries the least.
- Not hitting the target will get zero points.

Maximum number of shots - 3

Time limit- 2 minutes per shot

Mortar Kombat

Points:

- Point for this round will be given based on your accuracy.
- Innermost circle: 200 points
- Middle circle: 150 points
- Outermost Circle: 100 points
- Outside all circles, but within the square: 50 points
- Hitting the circumference of any circle will fetch the points for the outer one
- Points achieved from each shot will be added to the total points.

Note: For ALL Rounds, a line will be marked on the arena, behind which the team members have to stand while shooting the target(s).

Contraption

Problem Statement:

You are required to create an imaginative and innovative sequence of energy conversions, such that once you provide an initial energy to the setup, the contraption continues to fulfill the final compulsory task, followed by an infinite assortment of steps.

Compulsory Task:

Your aim is to stir water in a tumbler using various contraptions.

Bonus Tasks:

1. Open a book.
2. Light a candle.

Rules and Regulations

General rules:

- Students should carry proof of identity issued by their institution.
- A team may contain min. 2 and max. 5 members.
- Same person cannot be a member of more than one team.
- An abstract of the contraption with mentioning the steps and energy conversions(if possible with diagram)
- The organizers reserve the rights to change any or all the rules above rules.
- No chemical explosions are allowed during working of contraption.
- No AC/DC power supply shall be provided to you.

Contraption

Contraption Rules:

- An initial set up time of 120 minutes will be given to each team.
- Setup time of 30 minutes will be given before 2nd trial, whereby 10% of the total points scored after your successful trial in the second attempt will be deducted.
- Only two trials or attempts are allowed.
- Maximum three hand touches are allowed including hand touch at the time of starting the contraption. For further 4th, 5th, 6th hand touches 5, 15, 30 points will be deducted respectively. Further hand touch will lead to disqualification of the team
- You are not allowed to go for a hand touch at the last stage during your compulsory task or even the bonus tasks.
- The energy conversions after completing the task are not considered.
- For any kind of alterations in contraption at any point of time during trial, 30 points will be deducted.
- Steps have to be designed by the participating team only. The steps performed for energy conversion by any ready-made product will not be scored.
- Judges and coordinators decision will be final and binding to all.
- Bonus tasks are not compulsory; their completion will reward the team a bonus of 50 points each.
- Time taken for completion of tasks will also be considered in case of a tie.
- The judges will decide points for innovation and aesthetics.

Contraption

Abstract Details

Detailed write up of each and every step in tabular form, stepwise. Guidelines for submission of the abstract are as follows:

Include the information mentioned below in word document. Support your write up with appropriate image of your contraption. Note that even photos of incomplete contraption may be added in the abstract. This information shall be considered valuable for deciding design/ innovation prizes.

Criteria

Scoring Criteria:

Different types of energy conversions shall be awarded with different amount of marks, which shall be decided by the organizers. For repeated energy, conversion of any kind 4 marks will be deducted for subsequent energy conversion.

Judging Criteria:

- No. of steps in contraption.
- No. of energy conversions.
- Types of energy conversions.
- Originality of ideas and innovativeness.
- Complexity of overall contraption.

Création

Event Structure

Round 1

Task

Participants will be required to design a dam, on a half-completed terrain. A 3D model file of the riverbank at the site of the dam will be given, and the participant will have to construct the dam on it without making much changes to the given river bank model.

Time duration = 3 hrs.

Evaluation

The evaluation will be based on the following criteria:

Maximum points are given in brackets.

Sketching (30 points)

3D modelling (40 points)

Finishing (20 points)

Overall appearance (10 points)

Physical feasibility (bonus 10 points)

Création

Round 2

Task

Participants will be required to design a 3D model of **one** of the items provided at the venue specifically for this purpose. The items range from geometrical structures to everyday objects. The availability of items will be on a first-come-first-serve basis.

Time duration = 1 hour

Evaluation

The evaluation will be based on the following criteria:

Maximum points are given in brackets.

Sketching (30 points)

3D modelling (40 points)

Finishing (20 points)

Overall appearance (10 points).