

# NitroThrust

## THEME

An engine or motor is a machine designed to convert one form of energy into mechanical energy. Heat engines, like the internal combustion engine, burn a fuel to create heat which is then used to do work. Electric motors convert electrical energy into mechanical motion, pneumatic motors use compressed air, and clockwork motors in wind-up toys use elastic energy. An engine plays an important role in automobile industry revolution. Radio-Controlled, IC engine RC Car is a way to learn about different type of IC engine and to model a high speed RC car with innovation.

## PROBLEM STATEMENT

For all those who believe in setting the place on fire! Here's live experience of a racing tournament. Make a wireless remote-controlled car, powered only by an IC engine which can compete with other teams and can score maximum points in the least possible time on a well-designed off-road track with obstacles.

## TEAM SPECIFICATIONS

- A team may have a maximum of 5 members.
- Participants from different educational institute may also form a team.
- Each participant can be a part of one team only. If same participant is found as a member of more than one team , will lead to disqualification of both teams.
- Each participant should have their institute id card.



## STAGES OF THE EVENT

- Abstract Submission
- Inspection
- Race Event
  1. Preround
  2. Final Round

## TECHNICAL SPECIFICATION

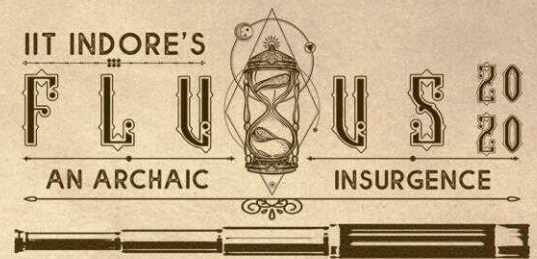
### Vehicle Dimensions

1. Machine should fit in a box of dimensions 600mm x 500mm x 500mm (l x b x h) at any moment of time during the race. The external device which is used to control the machine is not included in the size constraint.
2. The machine may be roughly classified into structural and functional parts:
3. Functional parts - Gears, differential gear, engine, springs, shock absorbers, servo motors (non-propulsion purposes only), batteries, wheels, wheel hub are allowed to be used as available in the market.
4. Structural parts - Chassis, steering mechanism, shock towers, suspension (excluding upper suspension arm, suspension spring and shock absorbers), have to be built by the participants themselves.
5. The car will be checked for proper throttle control.

### ENGINE

1. The maximum allowed capacity of IC engine to be used is 4.6 cc and this will be checked before the competition (i.e. Participants can also use 2.5 cc, 3 cc, 3.5 cc or any other IC engine lower in capacity).





2. There is no restriction on the type of IC engine (either glow or diesel cycle engine), but the engine must have throttle control. But use of any other chemical, compressed gas, rocket powered system, DC motors or any other means as found to be dangerous by organizers will not be allowed.
3. Any mechanism which uses DC motors for propulsion will be disqualified. However DC motors and servos can be used for steering mechanism or any other control mechanism apart from propulsion.
4. The percentage of nitromethane should not be exceed 20% by volume in the fuel, it is the responsibility of the participants to bring and take care of their individual fuel requirements

## **STEERING**

Steering mechanism have to be built by the participants themselves. Participant will be immediately disqualified if mechanism is found to be ready made.

## **POWER SUPPLY**

The machine must have an on-board power supply to provide power to any mechanism requiring electric power not exceeding 12V.

## **RADIO-CONTROLLER**

1. The machine has to be necessarily controlled by a wireless remote-control system.
2. Participants are required to use a remote control of frequency of band spectrum 2.4 GHz. The above rule is to ensure that there is no frequency clash during the competition and participants are not allowed to use any other remotes with frequency other than 2.4 GHz. (In case of unavailability of remote control (i.e. 2.4 GHz) the participants are required to submit their remote in organizers desk and it will returned during respected practise slots and race only, in order to avoid frequency clash)

## **CONTROL SPACE**

An elevated podium will be provided for the control of the machine. The podium will ensure good visibility for the controller.




## TRACK SPECIFICATIONS

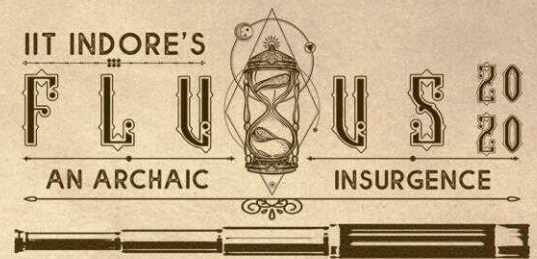
1. The race track will be an off-road dirt track with left & right turns, hairpins, S-shaped curves, bumps and puddles.
2. Participants are advised to use proper suspension systems for their machines to endure the bumps.
3. A lap is deemed to be completed when the machine completes the entire track & comes back to the starting point.
4. The track will have checkpoints at regular intervals. If a machine tumbles, or halts, or goes off the arena at any point on the track, one of the team members is allowed to lift it up and place it at the nearest checkpoint behind that point. The time shall still be running in the meantime.
5. Team members are not permitted to touch either their machines or those of their opponents once the race begins (unless there is need to lift the machine as stated in the previous point). The penalty for doing so is disqualification.

## JUDGING CRITERIA

### INSPECTION

1. Participants report to the venue with their cars.
  2. Strict inspection of the car is carried out according to the guidelines & regulations set by the organizers.
  3. All teams will be given practice slots of some minutes each, after the inspection is completed.
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## **RACE EVENT**

### ***Preround***

1. All teams will now have to compete in a time trial.
2. Each team will be given a run of 2 laps & ranking will be according to shortest time.

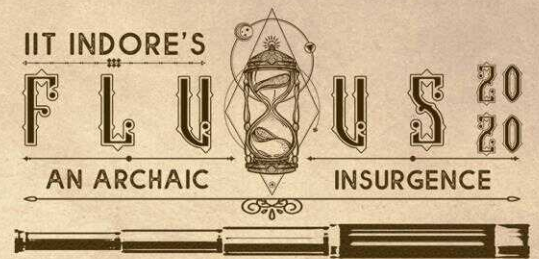
### ***Final Rounds***

1. Teams will be selected on basis of pre round to race in final round
2. This will primarily be a knockout round where teams will be given a run of 3 laps.
3. Head to head knock out races would be held to determine the winner and in the finale (race between top 2 teams), teams will be given a run of 5laps.

## **GENERAL RULES**

1. If the machine is found unsafe to run on the track, the team will be disqualified from the race. The organisers' decision will be final and binding in this respect.
2. The vehicles are not allowed to leave any loose parts on any part of the arena. Any vehicle disintegrating during the race will be disqualified.
3. Teams are not allowed to deliberately damage the machine of the opponent's team. If found doing so on track (while racing), the concerned team will be disqualified.
4. The teams must adhere to the spirit of healthy competition. The coordinators reserve the right to disqualify any team indulging in misbehaviour.
5. If any of the machines start off before the flag is waved, the counter will be restarted and the machines will get a second chance. However, if any machine starts off before the waving of the flag (or countdown) for a second time, it will be disqualified. No rematch will be held for the second time
6. Results will be based on a point system for both events. The event grading is independent of one another.





7. Inspection Round will be considered while assigning points. If the specified fabrication is not done, points will be deducted accordingly.
8. Only two persons from a team are allowed inside the track arena.
9. If both the tyres of the car go out of the track, the car should be restored back to the previous checkpoint.
10. Failure to restore the car on the call of organisers will lead to disqualification.
11. Marshall man (from each team) should be conscious as to not damage the track while assisting; damaging the track will lead to disqualification of the team.
12. Marshall man should assist if and only if the car goes out of the track or if the organiser says so.
13. During the race your car should not touch or be an obstacle to the other car. In case of collision of cars, both the cars should be taken to the nearest checkpoint.

**THE ORGANIZERS RESERVE THE RIGHTS TO CHANGE ANY OF THE ABOVE MENTIONED RULE AS THEY DEEM FIT.**

## **ABSTRACT SUBMISSION**

- Every team has to submit a written abstract about steering, suspension, braking mechanism, chassis layout, some related photos and description and specification of all component etc.
- Format of the abstract is available for download from the website. Edit the same file and submit your abstracts.
- Abstracts can also be submitted after registration.
- All the submission must be made online before the deadline (**30<sup>th</sup> jan 2020**) to [fluxus@iiti.ac.in](mailto:fluxus@iiti.ac.in)



## GENERAL INFORMATION

1. All the stage of event will take place during FLUXUS TECHNICAL-TECHGNISTA at IIT INDORE.
2. Format of the abstract is available for download from the website. Edit the same file and submit your abstracts.
3. Any change will be uploaded on the website.
4. All the dimensions are subjected to minor tolerances.
5. All the participants will get certificate of participation and top three team will get certificate of Excellence .

## CONTACT

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## NITROTHRUSTABSTRACT FORMAT

Rename this abstract as "Teamname.docx" and mail it to [roboticsclub@iiti.ac.in](mailto:roboticsclub@iiti.ac.in). Last date for submission of abstracts is **30<sup>th</sup> Jan 2020**.

- Team Details:

S.No	Name	Institute	Contact and Email ID

- Dimensions of the Car(L\*W\*H in Inches):
- Tested Speed (in Km/hr):
- Battery Specifications  
Eg-7V, Ni-MH, 1500mAh
- Weight of the vehicle (without Battery and with battery in Kg)
- Steering, suspension, braking mechanism with photos
- Engine Specifications and fuel specifications:  
Eg- 4.6cc, 20% nitromethane
- Components:  
Please do list the structural and functional components of your car as mentioned in the rules of the event. And also mention the materials you used in the fabrication of the structural parts.
- Design : Pictorial representation is a must along with its design and modelling aspects. Attach photo of their empty chassis.
- Costing :

Please mention the parts and their cost.

**NOTE: BRING A PRINTED COPY OF THIS ABSTRACT FOR STAGE 2**