

# Nitro Surge

## About:

Ever wanted to feel the power of the driving force of the F1 cars and the monster trucks? Does your adrenaline level rush up after hearing the voice of an IC engine? Come and build your own beast machine at Full Throttle.

It's not a sport when people keep their life on the line just to see the better driver. It's a game of tactics, real time strategy and daring choices. The speed of the car is the least of the factors which determines the winner.

So, come and race away against your rivals and prove your machine worthy at Mini F1 Race, a remote controlled IC engine car race, where 'speed' is a common word but 'winner', You need to earn it! .

## Task:

Race against time and opponents on the given track and finish first.

## Specifications:

1. Machine should fit in a box of dimensions 700mm x 500mm x 600mm 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 should be controlled by a wireless remote control mechanism throughout the race.
3. The machine must not be made from Lego parts, or any readymade assembly kits other than the parts mentioned below. Readily available chassis layouts are not allowed. Any machine found having a readymade chassis will be disqualified.
4. The machine parts may be roughly classified into structural and functional parts: Functional parts Gears, differential gear, engine, springs, shock absorbers, servo motors (non propulsion purposes only), batteries, wheels and

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wheel hub can be directly used as available in the market. Structural parts Chassis, steering mechanism, shock towers and suspension (excluding upper suspension arm, suspension spring and shock absorbers) have to be built by the participants themselves.

5. Judging for the same will be strict and the participant will be immediately disqualified if any of the above structural components are found to be ready-made.

6. The tires must have a minimum diameter of 3 inch. You are advised to use tires of good width for better performance on dirt tracks.

### **Engine :**

1.The machine must be propelled forward using IC engines (Max power of 4.6 CC). But use of any other chemicals, compressed gas, rocket powered systems, DC motors or any other means as found dangerous by the organizers will not be allowed.

2.Start control mechanism: The start control mechanism must not provide any thrust to the vehicle along direction of motion of track.

3.Those participants using IC engines must note that their starting mechanism must be removable and not interfere with the race.

4.Any machine which uses DC Motors for propulsion will be disqualified. However DC motors and servos can be used for steering mechanisms or any other control mechanisms apart from propulsion.

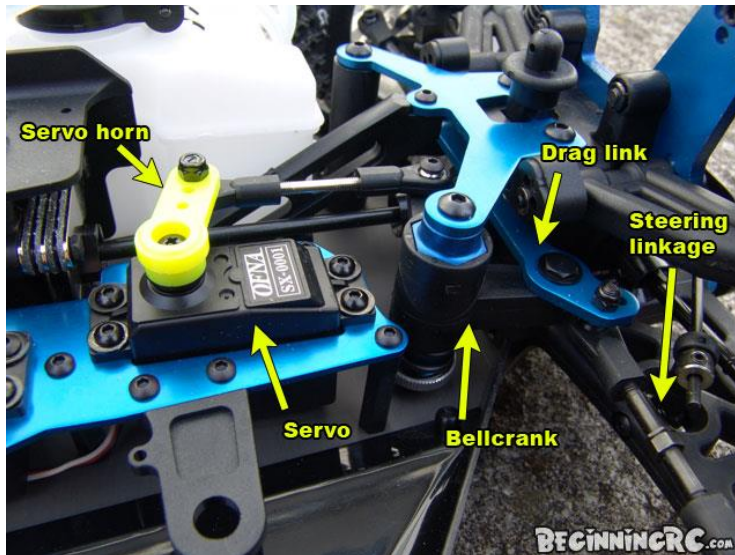
### **Steering:**

1.Steering mechanism have to be built by the participants themselves.

2.Judging for the same will be strict and the participant will be immediately disqualified if any of the above structural components is found to be ready made.

3.The machine must have an on-board power supply to run any mechanism requiring electric power for steering. The electric voltage anywhere in the machine should not exceed 12V at any point of time.

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### Fuel:

The percentage of nitro should not exceed 25% by volume in fuel.

### Suspension mechanism:

Any part rigidly connected to suspension arms or one with no degrees of freedom with respect to suspension arm will be considered as its part. For example both the heim joint for the upper suspension arm and the stud rigidly connected to the wheel hub can be bought from the market.

### FUNCTIONAL PARTS:

Gears, differential gear shift, engine with clutch, pulley and pulley belt, springs, motors and servos (non-propulsion purposes only), batteries, wheels and suspensions are allowed to be used as available in the market

**Tires:** The tires must have a minimum diameter of 3 inch. You are advised to use tires of good width for better performance on dirt tracks.

**Wheel Hub:**

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Any part rigidly attached to the wheel hub will be considered as a part of it and hence can be ready-made. An example here is that of the ball stud

- Providing a clutch mechanism between the engine and the wheel would prove useful, as it would prevent the engine from dying out at any stage of the race.
- Participants are advised to use a proper cooling mechanism to prevent overheating of the engine.
- Participants are advised to use sway bars for better control and stability.
- The participants are advised to use proper air filters as dirt might cause serious problems to the engine.
- The machine will be inspected and if found to be dangerous, the team will be disqualified. This decision rests solely with the judges and the organizers.
- The body cover should be detachable so that the interior can be inspected.

### Radio controllers

The teams will have to control three components of the car viz.

Engine throttle

Steering

Brake system

The machine has to be necessarily controlled by a wireless remote control system.

Note that participants are required to bring two remote controls of distinct frequencies or a dual frequency remote control

### DESIGN CHALLENGES:

#### Chassis

- The wheel base should not be less than 350 mm
- Chassis should be designed and manufactured compulsory.
- Chassis can be made of any material and multiple layers of different materials are allowed.

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- The tracks will be built according to a 1:8 size car

### Suspension design challenge:

- Car must have this mechanism attached to it.
- Team can either implement it on rear or front wheels.
- The suspension should be interconnected such that if one wheel goes up one should go down (interconnection should be for either front or rear set of wheels).
- The suspension assemble should be symmetrically placed about the central line of the car.

### Dimensions of the Track:

- Width of the track will 1.5 meters
- Width of short cut tracks 70-90 cms
- Height of bumps will be 15-25 cms
- Height of Ramps will be 20-30 cms
- Height of small bumps 10-15 cms
- Height of small Bridge 25-35 cms

### Rules to be followed while assembling your machine :

1. The teams are expected to self assemble the machine. Team will be disqualified if the complete machine is found to be ready made and purchased.
2. Any team with completely purchased machine found participating will be disqualified
3. The team must submit two photos of the machine 1) before assembling 2) after assembling
4. Decision of the authority will be final and binding on all

### Testing Criteria:

**Round 1:** Eliminations will be based on the total points received in the round one and 50% of the teams will qualify for round 2. In round one 30% of the points will be given to fabrication and 70% for racing.

**Round 2:** There will be one-on-one racing in this round and 6 teams will be selected to round 3.

**Round 3:** In this round 3 laps one-on-one race will be conducted.

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**Wild Card Entry:** One team will be selected to final by wildcard entry

**Finals:** Three teams will be competing each other in the finals. There will be total of 5 laps.

### General Rules and regulations

Each team can comprise of a minimum of two members and a maximum of five members. Each member must be a student with a valid ID card of the respective University or college.

If the machine is found unsafe to run on the track, that team will be disqualified from the race. The coordinators decision will be final and binding in this respect.

At the time of registration, teams will be provided with a registration number and will be allotted time for the qualifying rounds.

Any team that is not ready at the arena at the time specified will be automatically disqualified.

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.

The teams must adhere to the spirit of healthy competition. The coordinators reserve the right to disqualify any team indulged in misbehaviour.

The organizers reserve the rights to change any or all of the above rules as they deem fit. Change in rules, if any, will be highlighted on the website and notified to the registered participants.

All decisions by the coordinators are final and binding.

Note: Problem Statement, Rules and Scoring may change and all changes shall be reflected in the website. And hence, the teams are responsible for keeping themselves well informed about the event.

### The written abstract should be prepared on the following lines:

1. The steering mechanism, suspension mechanism, braking mechanism, the chassis layout, must be explained in detail along with proper diagrams. Ready-made kits are not allowed. Picture(s) showing all the three should be attached.

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2. Photographs of empty chassis have to be attached. The chassis has to be built by the participants themselves. If participants have already proceeded building their chassis, they are requested to take photographs of their machine in current state. These photographs are required for verifying that the machine has been indigenously built.
3. The specifications of ALL the components used, including engine, suspension springs, remote controller etc. have to be mentioned.



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