IIT Bombay RACING NRB BEARINGS

Newsletter

NOV 2026

IIT Bombay Racing is a 120+ member student team developing high-performance electric race cars and autonomous mobility systems. Competing internationally at Formula Bharat, Formula Student Portugal and Switzerland, we combine cutting-edge R&D with hands-on engineering. In 2026, we achieved a landmark victory at Formula Student Portugal, winning both the Overall Electric and Overall Driverless categories as well as a podium finish at Formula Bharat 2026.



Formula Student

Formula Student is a leading student engineering competition where university teams design, build and race single-seater cars. With 1,500+ teams across 80+ countries, it tests engineering excellence across two key categories:

Static Events	
Engineering Design:	Evaluates the car's design choices, engineering decisions and technical execution
Cost and Manufacturing:	Assesses manufacturing processes, costing and production efficiency
Business Plan Presentation:	Tests the team's ability to present a viable business case for their vehicle



Dynamic Events	
Acceleration:	Tests the car's straight-line acceleration
Skidpad:	Evaluates cornering ability and lateral grip ∞
Autocross:	Tests handling and performance on a technical track
Endurance:	Challenges the car's reliability and performance over a 22 km run
Efficiency:	Measures energy consumption during the endurance event



A Landmark Season

Formula Student Portugal 2026



Category	Result
Overall (Electric Vehicle)	1st 🥇
Driverless Cup, Overall	1st 🥇
Engineering Design Presentation	1st 🥇
Cost and Manufacturing	2nd 🥈
Business Plan Presentation	4th
Efficiency	1st 🥇
Endurance	2nd 🥈
Autocross	3rd 🥉

* 1st Indian team to win an electrical and a driverless formula student competition in Europe

Formula Student Switzerland 2026

Category	Result
Overall	13th
Business Plan Presentation	8th
Acceleration	7th
Skid-Pad	9th
Design	17th
Cost	18th



Representing India on the international stage, we secured 13th overall at Formula Student Switzerland 2026, competing against a strong international field and showcasing months of engineering, testing, innovation and teamwork.

Formula Bharat 2026



Category	Result
Overall	3rd 🥉
Statics	1st 🥇
Engineering Design Presentation	1st 🥇
Cost and manufacturing	2nd 🥈
Business Plan Presentation	9th

We unveiled India's first Formula Student Driverless platform, marking its first public showcase and laying the foundation for our historic Driverless Cup victory at Formula Student Portugal 2026.

Challenges faced and how we overcame them!

A season like this one does not come without its share of near-disasters. During early testing in Leoben, Austria, a fault in our steering algorithm sent repeated maximum-steering commands to the car, pushing it off the track and bringing it uncomfortably close to a serious crash. Competing overseas came with its own set of problems, and they looked nothing like the first. Unlike local teams, who arrived with trucks and trailers, our car travelled disassembled. While other teams were already setting up their pits, we were still putting ours back together, bleeding brakes, running dry checks and preparing for scrutineering from scratch. With fewer resources at our disposal, every step took longer, and a broken 3D printer in the middle of it all only added to the struggle.

The team tackled each of these challenges head-on. The steering fault was traced and fixed within the same testing session, serving as a sharp reminder that even an entire season of simulation can only prepare you so much for the real thing. That same appetite for calculated risk carried into the endurance event, where we pushed our motor controller's parameters further than ever before, achieving a team first built on a simple philosophy: first or nothing. It paid off. The culmination of all this problem-solving under pressure was completing scrutineering ahead of schedule at both Formula Student Switzerland and Formula Student Portugal, proving that a year of preparation back home translates into execution when it matters most.

Future Goals (2026-27)

Podium Finish
Aim to win Formula Student AI and Formula Student UK

In-Hub Motors
Dual in-hub motors for reduced drivetrain weight

Better Integration
More accessibility with improved rain-test compliance

600V Accumulator
Upgrade from the previous 400V to a 600V architecture

Next-Gen Actuators
More Responsive driverless braking and steering

Weight Reduction
Optimized parts for weight; 15 kg reduction from chassis

Driverless Speed
Target average speed of 60+ km/h

Design Validation
Validate aero, torsional rigidity & suspension linkage forces

Our Subsystems

Mechanical



Structural

Responsible for the car's chassis, aerodynamic package and crash protection, balancing stiffness, weight and manufacturability. We build around a single-piece carbon-fibre monocoque, with hand-laid, oven-cured panels bonded into a load-bearing shell that integrates the suspension and powertrain.

Powertrain

Converts electrical energy into motion through two rear-mounted EMRAX motors, controlled by a UniTek inverter. A compact planetary gearbox transmits power, while a shared coolant loop with two air-cooled radiators keeps the motors and inverters within operating limits.

Dynamics

Optimises vehicle handling through suspension, braking and steering integration. Using MATLAB and IPG CarMaker simulations, we tune suspension characteristics, steering geometry and braking performance, continuously validating our models against real-world data.

Electrical



CCD
(Controls, Communication and Data Acquisition)

The car's central nervous system, collecting sensor data and feeding it to driver and control systems. Our touchscreen dashboard displays critical information, while IMU, throttle, brake and steering sensors support torque control and data logging. CAN, Ethernet and LTE enable real-time telemetry and vehicle monitoring.

AMS
(Accumulator Management System)

Safeguards the high-voltage battery by continuously monitoring cell voltage, current and temperature. Our in-house, master-slave system communicates over ISO-SPI and CAN, while an Insulation Monitoring Device detects isolation faults and triggers automatic shutdown when necessary.

ESI
(Electronic System Integration)

Integrates the car's electrical systems into one reliable, fail-safe architecture. Independent hardware watchdogs, diagnostic LEDs and a continuously monitored shutdown circuit ensure that faults in individual components do not compromise overall vehicle safety.

Driverless



Perception

Enables the car to interpret its surroundings using cameras and LiDAR. Our system detects and classifies track cones by size and colour, identifying their positions in the vehicle's reference frame with approximately 98–99% accuracy, even under aggressive driving.

SLAM

Simultaneous Localisation and Mapping (SLAM) allows the car to map its surroundings while tracking its own position. Our system combines perception data with vehicle position estimates to build a global track map and continuously localise the car.

PPC

PPC (Path Planning & Controls) Determines the car's trajectory and translates it into driving commands. Our system plans safe paths, optimises lap times and applies control algorithms to manage throttle, braking and steering while navigating the track.

SIM-DEV

Creates a virtual replica of the car and its environment to test the driverless stack before deployment. Built on CARLA, our simulation incorporates customised vehicle dynamics, sensor behaviour, weather effects and track environments to closely replicate real-world conditions.



Business

The Business Subsystem bridges engineering and the outside world through three pillars: Business Plan Presentation (BPP), Marketing and Operations. BPP translates our technology into a viable business case through market, competitor and cost analysis. Marketing manages sponsorships, branding, social media and communications, while Operations oversees budgets, partnerships and team coordination.

Sponsors

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