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# **TEAM RGIT RACING**



The purpose of TEAM RGIT RACING - student Chapter at Rajiv Gandhi Institute of technology, Mumbai - To enhance the knowledge base of members who are mobility practitioners. To provide to its members access to SAE International programs and services globally enabling them to practice world class standard in productivity and quality. Its area of focus is Automotive, Automobile, Aerospace and Commercial Vehicle.

SAE International is a professional organisation and has over 138,000 global members. Aside from its standardization efforts, SAE International also devotes resources to projects and programs in STEM education, professional certification, and collegiate design

competitions.

SAEINDIA is a membership organization Founded in 1994 and in 2003 SAEINDIA became an Affiliate of SAE International. Today the President of SAEINDIA is Dr. R.K. Malhotra has a membership count of more than 40,000 members around India.

Website TEAM RGIT RACING: https://www.teamrgitracing.in



Website SAE INTERNATIONAL: http://www.sae.org/

Website SAEINDIA: http://www.saeindia.org/

Team RGIT Racing's Faculty Advisers: Prof. S. D. Gaikwad and Prof. Nikhil. V. Sarojini

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## **FSEV Concept Challenge 2021:**

The FSEV Concept Challenge provides teams like us with an opportunity to design an electric powertrain package for competitions like Formula Bharat. It involved showcasing the ideas and detailed designs of the various components that the team had in mind for our future projects. We began preparing for it in early 2021 and it involved the participation of many of the team's current second and third year engineering students.



For this competition, we had to submit multiple documents required for the FSEV Concept Challenge between June and July. This included the Failure Mode and Effects Analysis Report (FMEA), Procurement Strategy Report (PR), Design Specifications Sheet (DSS), Engineering Design Presentation (EDP) within Supporting Document (SUP), Team Management Strategy

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Report (MGMT), Software Architecture (SA) and Algorithm Development (AI), and the Team Member Information (TMI).

As for the design of the powertrain, we provided a rundown of the ideas and plans we had for our car from Formula Bharat 2023 and more. With regards to the motor selection, we will upgrade our current system to a dual motor setup involving the Agni 119R with the addition of Torque Vectoring, which will help us in maneuverability. The motor will require a maximum current of 315A and a capacity pack between 6-6.5 kWh for optimal working. For this, our accumulator container will contain 495 cells of Molicel INR 18650 P28A in 55s9p configuration. Moreover, our system will contain Data Logging and ECU to monitor data provided by the sensors continuously.



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The other reports submitted in the competition revolved around the behind-the-scenes work that goes into developing this powertrain for our car. While the Procurement Report talked about the timeline of our design plans, the Team Management Report included details about how the team operates on a daily basis. Once we submitted all the reports, the team took part in a Q&A session, where the competition judges cross-examined our designs and reports to know the reasoning behind many of our choices and plans. Following that, they provided us with helpful feedback to improve our designs and fine-tune our builds. After months of hard work, Team RGIT Racing Electric ranked 20<sup>th</sup> in FSEV Concept Challenge 2021 out of 31 teams.

## Accomplishments at FSEV Concept Challenge 2021

 $> 1^{st}$  time Torque Vectoring EV powertrain design

Procurement Strategy- 53.85/75

► Engineering Design - 131.5/150

➤ Team management - 44.14/75

➤ Software Integration- 27.7/30

≻ Overall Rank – 20<sup>th</sup> out of top 40 team from Indian Universities.

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## **Team Training Program**

Microsoft Teams

- Team RGIT Racing conducted basics of automobile 5 day workshop for members only from 14<sup>th</sup> Sept to 18<sup>th</sup> Sept 2020
- Every parts of FSAE vehicles were explained which helped members to understand about various sub systems.



 $\succ$  Recorded sessions were provided to all the team members.

## Software Training Program

### Microsoft Teams

- Team RGIT Racing conducted Software training program 6 day workshop for members only.
- Main software that were covered were Solidworks, Ansys & Protius.
- Each sub department head conducted session in individual batches for better understanding



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## Formula Bharat 2022:

**About the competition:-** Formula Bharat is an Engineering Design competition focused towards developing a Race car which complies with strict rules and regulations laid by Formula SAE (FSAE). Teams design, fabricate, test and develop a Formula style race car and are judged on engineering design, Cost, and business viability of the car.

While FSEV Concept Challenge 2021 provided Team RGIT Racing Electric with a significant challenge and experience, Formula Bharat 2022 was always our biggest focus. The competition revolves around developing a car, which will be judged and tested for reliability, performance and cost-efficiency. These vehicles will have to follow a set guidelines regarding its development because of various reasons, and teams which won't comply with the rules won't clear Technical Inspection for the cars to run in the Autocross and Endurance events.

### **Current Progress**

The work for the upcoming competition began last year as our team shifted from the world of Combustion to Electric during the COVID-19 pandemic. For the past few months, our entire work revolved around the design and manufacturing of the team's first attempt at an Electric Vehicle (EV) for the competition. While our design phase ended earlier this year, the past few months have revolved around the manufacturing of this vehicle and its various components.

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As of right now, we are currently in the last stretch of preparations of manufacturing and testing before we send the car to Coimbatore in January for the competition. With regards to the manufacturing, we have completed important components like the Chassis and Powertrain for the system.

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We still have minor reworks on these components, but the bulk of important work is done, and we just have a few finishing touches to provide them. As for the accumulator, we currently have finished our container while we wait for our cells that will power our car to glory.

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Moreover, we still have work to do with the Electricals of the car including the wiring, BMS and other systems. As for the Body Works, we are currently manufacturing the Nose of the car which will sit atop the front of the Chassis. The manufacturing of Suspension has almost come to a close as well, with only minor reworks and touches remaining. Finally, the all-important steering is also complete with just some reworks remaining for the steering-rack.