NEW HORIZON
COLLEGE OF ENGINEERING

LIION racing- Event Report

2023-2024

Team LIION Racing, an official Motorsport team from New Horizon College of Engineering Bengaluru, was established comprising of students from various departments of the institution, including Automobile Engineering, Electrical and Electronics Engineering, Mechanical Engineering, Information Science and Engineering, and Electronics and Communication Engineering. The team comprises some of the brightest minds from these departments and was formed to compete in a national-level E-Bike Championship hosted by ISIE India.

The IMPERIAL SOCIETY OF INNOVATIVE ENGINEERS ISIEINDIA, a leading organization in India for EV Skill Development, E-mobility (Vehicle Design & Manufacturing) Events, Electric Vehicle Professional Certification, EV Research, and Publication, hosts the E Bike Challenge. This event attracts students from across India who retrofit, self-manufacture, and innovate their E-Bikes, focusing on drive train innovation and other aspects of Electric Bike technology.

ABOUT THE EVENT

Figure 1 Event Poster

Figure 2 Welcome Arch

SCHEDULE

Schedule of SIEP E BIKE CHALLENGE 2024

Event Venue: IES University, Bhopal, Madhya Pradesh

DAY	EVENT DATES	PARTICULARS	STARTING TIME	END TIME	LOCATION	COMMENTS
DAY 0						
Wednesday	23rd January 2024	Truck Move In/Move Out	9:00 AM	1:00 PM		
Wednesday	24th January 2024	Event Control	9:00 AM	7:00 PM		
Wednesday	24th January 2024	Registration of Team, Faculty, ESO and Drivers	9:00 AM	1:00 PM	Registration Desk	Need to be done by Team Manager
Wednesday	24th January 2024	Pit Allotment	9:00 AM	1:00 PM	Registration Desk	
Wednesday	24th January 2024	Team Induction Session	10:00 AM	10:30 AM	Auditorium IES University	Mandatory for Team Captain, Vice Captain, Team Manger and Faculty Advisor
Wednesday	24th January 2024	Welcome / Opening Ceremony	10:30 AM	12:00 PM	Auditorium IES University	
Wednesday	24th January 2024	Vehicle Line Up	11:00 AM	12:00 PM	Sports Ground IES University	Guest visits to the Teams
Wednesday	24th January 2024	Group Photo	12:00 PM	1:00 PM	Sports Ground IES University	
Wednesday	24th January 2024	Team Vehicle Photo	12:00 PM	1:00 PM	Sports Ground IES University, Pit	At least 5 members should be there with the vehicle during opening ceremony
Wednesday	24th January 2024	Team Safety Briefing – Team ESO and Manager	12:30 PM	1:00 PM	Technical Inspection Bay	Mandatory to attend the meeting for ESO and Manager
Wednesday	24th January 2024	Lunch	1:00 PM	1:30 PM		
Wednesday	24th January 2024	Hot Pits Available	2:00 PM	5:30 PM	Hot Pit Area	Hot Pits will be available for limited time to each team for minimum modification or damane in transport
Wednesday	24th January 2024	Pre Inspection - Safety	2:00 PM	5:30 PM	Technical Inspection Bay	Registration Process completed teams can line up for Inspection
Wednesday	24th January 2024	Team Briefing – Team Captain	5:30 PM	6:00 PM		
Wednesday	24th January 2024	Site closed for participants	7:00 PM	9:00 AM		
DAY 1						
Thursday	25th January 2024	Event Control	9:00 AM	7:00 PM		
Thursday	25th January 2024	Team Briefing – Team Captain	9:00 AM	9:10 AM		Mandatory to attend the meeting for Captain
Thursday	25th January 2024	Tech Inspection I - Mechanical	9:10 AM	5:30 PM	Technical Inspection Bay	
Thursday	25th January 2024	Tech Inspection I - Electrical	9:00 AM	5:30 PM	Technical Inspection Bay	
Thursday	25th January 2024	Lunch	1:00 PM	1:30 PM		
Thursday	25th January 2024	Hot Pit Registration	9:00 AM	5:30 PM	Help Desk	Only after TI attempt 1
Thursday	25th January 2024	Charging Bay	9:00 AM	5:30 PM	Charging Bay	Only after clearing Accumalator check
Thursday	25th January 2024	Static Round - Design	9:00 AM	5:30 PM	Static Round Bay	As per the static event schedule for time slot per team
Thursday	25th January 2024	Team Briefing – Team Captain	5:30 PM	6:00 PM		
Thursday	25th January 2024	Site closed for participants	6:30 PM	9:00 AM		
DAY 2						
Friday	26th January 2024	Event Control	9:00 AM	7:00 PM		
Friday	26th January 2024	Team Briefing – Team Captain	9:30 AM	10:00 AM		Mandatory to attend the meeting for Captain
Friday	26th January 2024	Registration for Hot-Pit	9:00 AM	6:00 PM	Registration Desk	

Figure 3 Event Schedule

Friday	26th January 2024	Hot Pits Available	9:00 AM	6:00 PM	Hot Pit Area	Hot Pits will be available for limited time to each team and only 4 members are allowed from 1 team with safety gears
Friday	26th January 2024	Charging Bay Available	9:00 AM	6:00 PM	Battery Charging Zone	Only after clearing Accumalator check
Friday	26th January 2024	Tech Inspection II - Mechanical	9:00 AM	1:00 PM	Technical Inspection Bay	
Friday	26th January 2024	Tech Inspection II - Electrical	9:00 AM	1:00 PM	Technical Inspection Bay	
Friday	26th January 2024	Weight Test	4:00 PM	6:00 PM		Mandatory to complete weight test after clearing the Technical Inspection
Friday	26th January 2024	Lunch	1:00 PM	1:30 PM		
Friday	26th January 2024	Static Round - Innovation	9:00 AM	1:00 PM	Static Round Bay	As per the static event schedule for time slot per team
Friday	26th January 2024	Brake Test	4:00 PM	6:00 PM	Dynamic Round Zone	
Friday	26th January 2024	Acceleration Test	4:00 PM	6:00 PM	Dynamic Round Zone	
Friday	26th January 2024	Team Briefing – Team Captain	6:00 PM	6:30 PM		Mandatory to attend the meeting for Captain
Friday	26th January 2024	Site closed for participants	7:00 PM	8:00 AM		
DAY 3						
Saturday	27th January 2024	Event Control	9:00 AM	7:00 PM		
Saturday	27th January 2024	Team Briefing – Team Captain	9:30 AM	10:00 AM		Mandatory to attend the meeting for Captain
Saturday	27th January 2024	Charging Bay Available	9:00 AM	12:00 PM	Battery Charging Zone	
Saturday	27th January 2024	Drivers Briefing - Designated Drivers	9:30 AM	10:00 AM		Mandatory to attend the meeting for Designated Drivers of each team
Saturday	27th January 2024	Hill Climb Test	10:00 AM	11:00 AM	Dynamic Round Zone	
Saturday	27th January 2024	Off Road Test	11:00 AM	1:00 PM	Dynamic Round Zone	
Saturday	27th January 2024	Lunch	1:00 PM	1:30 PM		
Saturday	27th January 2024	Self Balancing Test	1:30 PM	3:00 PM	Dynamic Round Zone	
Saturday	27th January 2024	Vehicle Run of Modes	2:30 PM	4:00 PM	Dynamic Round Zone	
Saturday	27th January 2024	Driverless Parking Test	4:00 PM	5:00 PM	Dynamic Round Zone	
Saturday	27th January 2024	Charging Bay Available	4:00 PM	6:00 PM	Battery Charging Zone	
Saturday	27th January 2024	Team Briefing – Team Captain	6:00 PM	6:30 PM		Mandatory to attend the meeting for Captain
Saturday	27th January 2024	Site closed for participants	7:00 PM	8:00 AM		
DAY 4						
Sunday	28th January 2024	Event Control	9:00 AM	7:00 PM		
Sunday	28th January 2024	Driver's Breif by Marshalls	9:30 AM	10:00 AM		
Sunday	28th January 2024	Vehicle Line Up for Endurance	10:00 AM	11:00 AM		
Sunday	28th January 2024	Endurance Round	11:00 AM	1:00 PM		
Sunday	28th January 2024	Lunch	1:00 PM	1:30 PM		
Sunday	28th January 2024	Valedictory Ceremony	2:00 PM	3:00 PM	IES University Auditorium	
Sunday	28th January 2024	Certificate Distribution	4:00 PM	5:00 PM	Registration Desk	
Sunday	28th January 2024	Truck Move In/Move Out	5:00 PM	8:00 PM		
Note: This is tentative daywise schedule of event, There will be changed in the schedule on confirmation of Placement Drive, Expert Talk and Engageent Activities.						

Figure 4 Event Schedule

HOW IT ALL STARTED

The genesis of **LIION Racing** traces back to an email received by **Dr. Jaysheel Kumar**, Head of the Department of Automobile Engineering, from the event organisers **ISIE India**. The email contained details about a national-level electric bike challenge. It was later forwarded to the team captain, marking the beginning of our journey into the competition. The opportunity presented by ISIE India sparked our team's passion for innovation in electric vehicle technology, setting the stage for LIION Racing's involvement in the challenge.

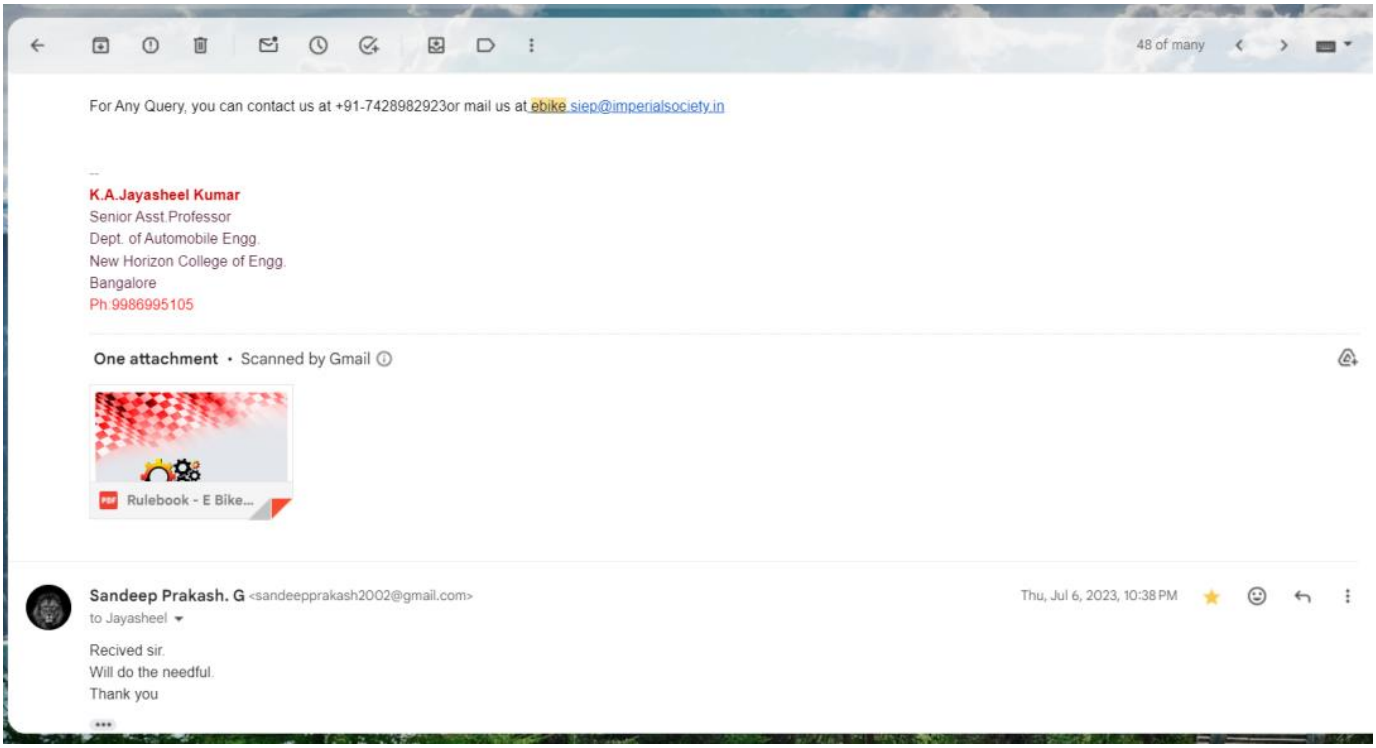

Figure 5 Email & Rule book

REGISTRATION

With the confidence after going through the rule book and forming the team successfully, the team decided to take a step further in a new challenge SIEP E-BIKE Challenge 2024.

Invoice Paid

Invoice No # **22712**

Invoice Date **Aug 24, 2023**

Billed By

Imperial Society of Innovative Engineers (ISIEINDIA)
H.No. 56, Gurudwara Wali Gali, Maqsudan, Jalandhar,
Punjab, India - 144001
GSTIN: 03AAAAI7613L1ZS
Communication Address: E-210, Second Floor, Sector 63, Noida - 201301

Billed To

Team LIION
New Horizon College Of Engineering, Bengaluru, India

	Item	Quantity	Rate	Amount
1.	E Bike 2024 Fee	1	₹30,000	₹30,000

Total (in words) : THIRTY THOUSAND RUPEES ONLY

Round on	₹0
Total (INR)	**₹30,000**
Amount Paid	(₹30,000)

Bank Details

Account Holder Name	Imperial Society of Innovative Engineers
Account Number	262601000476
IFSC	ICIC0000816
Account Type	Savings
Bank	ICICI BANK

Authorised Signatory

Payments

Date	Mode	Amount Received
Aug 08, 2023	Account Transfer	₹30,000

Figure 6 Payment Acknowledgement

STAGES OF PROGRESS TO FINISHING LINE

This professional journey is a statement of belief to our team's commitment and responsiveness to emerging opportunities in the dynamic landscape of innovation.

1. DESIGN

In compliance with the stringent guidelines of the SIEP E-Bike Challenge, our design adheres to a set of crucial specifications and regulations;

1.1 RESEARCH AND UNDERSTANDING

Building a chassis for an electric vehicle requires a comprehensive understanding of various factors, including materials, design considerations, and structural integrity.

By delving into these aspects, our research on chassis building for electric vehicle can provide a solid foundation for the team’s success and well-engineered project.

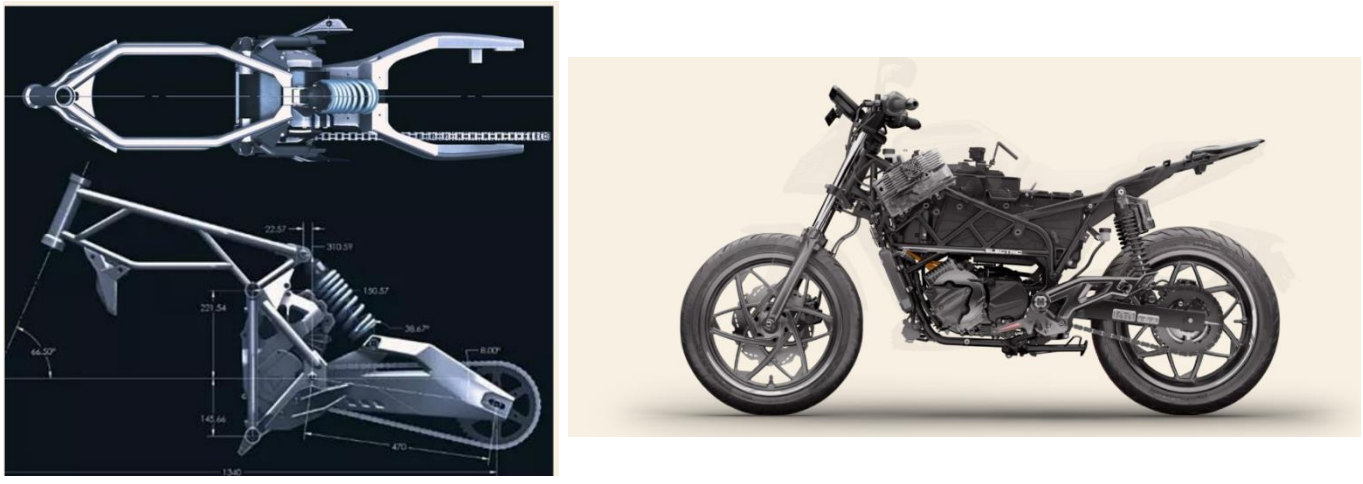

Figure 7 Reference Designs

1.2 DESIGN AND ANALYSIS

The team diligently undertook the essential calculations for each sub-assembly of the vehicle, meticulously ensuring accuracy and precision. These calculations served as the foundation for the comprehensive design of the frame using SolidWorks software. The design process incorporated intricate details and dimensions derived from the calculated parameters, enabling a meticulous representation of the envisioned structure.

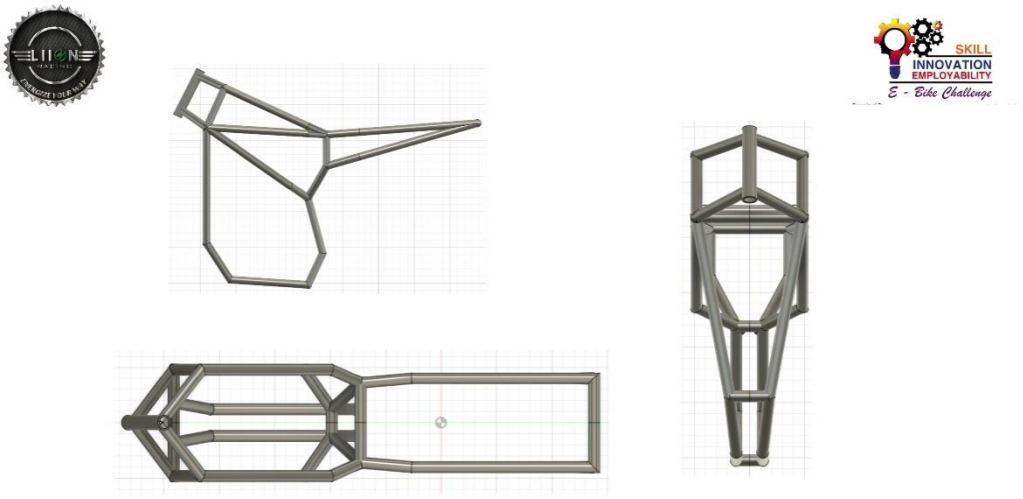

Figure 8 Design

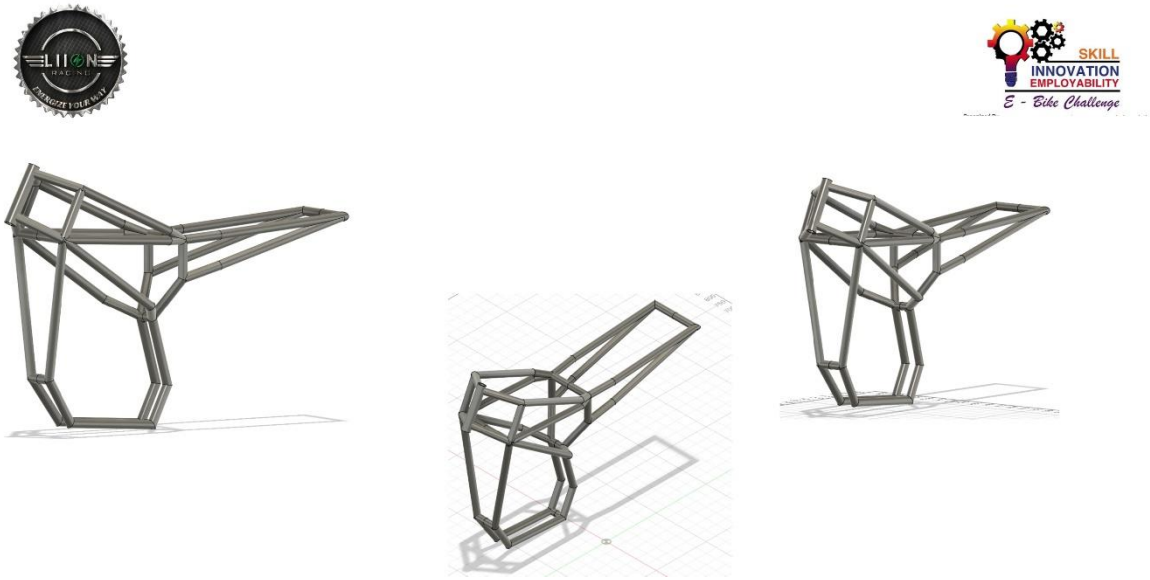

Figure 9 Design

Following the design phase, the team conducted a thorough static analysis on the frame. This analysis aimed to assess the strength and stability of the frame under various conditions and loads. By subjecting the design to static analysis, the team gained valuable insights into its structural integrity, identifying areas of potential stress or vulnerability. This systematic approach to design and analysis in SolidWorks allowed the team to refine and optimize the frame for optimal performance and durability in real-world scenarios.

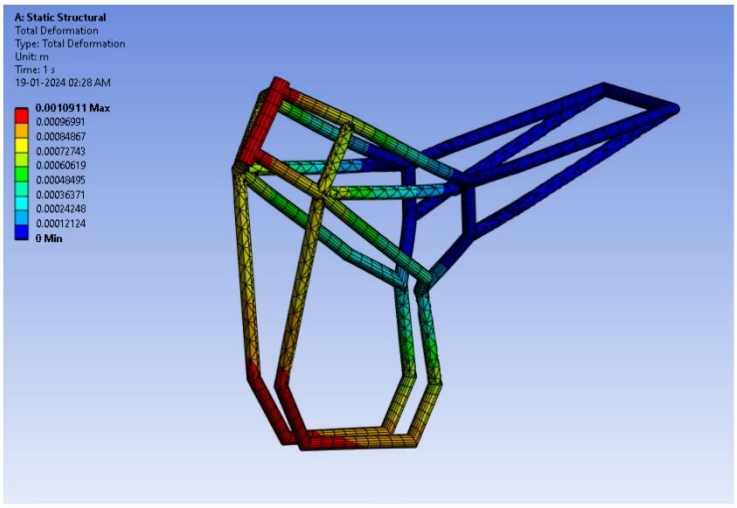

Figure 10 Engineering Analysis

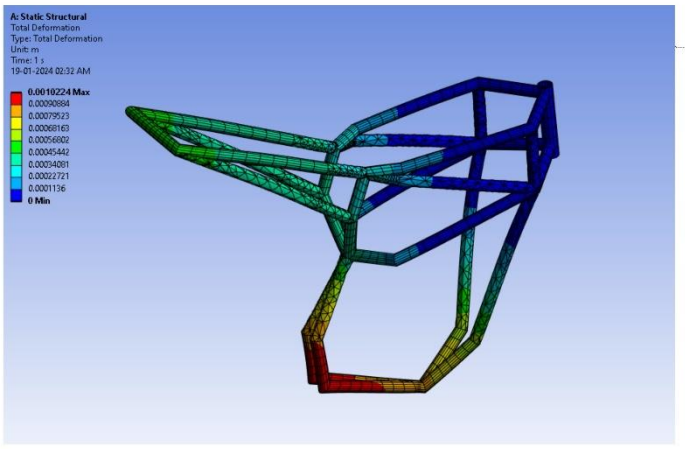

Figure 11 Engineering Analysis

2. MANUFACTURING

After the design phase was completed, the team started the manufacturing of the vehicle.

2.1 SOURCING THE REQUIREMENTS

The team initiated the fabrication process by procuring essential raw materials along with all the necessary spare parts, tools, and equipment. This strategic acquisition ensured a seamless workflow, as the team meticulously gathered everything required for the construction phase. The procurement encompassed a range of components, from raw materials forming the foundation of the project to spare parts that would contribute to the vehicle's functionality.

2.2 FABRICATION

The fabrication team embarked on a meticulous and hands-on process, translating design concepts into tangible reality.

- Material Preparation

Figure 12 Grinding

- Component Assembly

Figure 13 Assembly

- Welding and Joining

Figure 14 Welding

- Quality Assurance

Figure 15 Ergonomics Check

Figure 16 Wirring Check

- Safety Compliance

Figure 17 Safety Check

The fabrication team's dedicated efforts encompass a blend of precision, craftsmanship, and adherence to quality standards, contributing to the realization of the envisioned electric vehicle

During the fabrication phase, LIION Racing encountered a myriad of challenges that tested their mettle. The journey was marked by a series of failures, requiring the team to constantly iterate and refine their approach. Despite the demanding nature of their academic schedules, team members dedicated themselves to the project, managing semester

examinations alongside the rigorous demands of fabrication. Sourcing components from diverse regions across Maharashtra, Tamil Nadu, Kerala, and Karnataka added a layer of complexity, necessitating efficient coordination and logistical planning. Once acquired, the components underwent rigorous testing to ensure optimal performance and integration into the motorcycle.

The team's proficiency in fundamental engineering operations such as metal cutting, welding, grinding, and drilling was pivotal in bringing their vision to life. Each step required precision and attention to detail to achieve the desired outcome. On the electrical front, a specialized team focused on developing and fine-tuning the battery, motor, and auxiliary systems. They tackled intricate wiring harnesses and resolved technical glitches with ingenuity and perseverance, striving to optimize the performance and efficiency of the vehicle.

In parallel, the team navigated the intricacies of fundraising, securing vital resources to support their endeavors. Effective management of personnel ensured that each team member's skills were utilized to their fullest potential, fostering a collaborative and cohesive environment.

As the project neared completion, meticulous planning was undertaken for the transportation of the vehicle to Bhopal, Madhya Pradesh, where it would undergo further testing and evaluation. This phase encapsulated the team's unwavering commitment, resilience, and innovative spirit, culminating in the successful realization of their vision amidst a backdrop of challenges and constraints.

TEAM STRENGTH

Faculty Coordinator: Dr. Jaysheel Kumar, Head of the Department of Automobile Engineering

Department of Automobile Engineering :

1. Sandeep Prakash G -1NH20AU029
2. Shivin Swaroop P S - 1NH20AU031
3. Karthikeyan M - 1NH21AU400
4. Sachin U - 1NH20AU027
5. Madhumitha.K -1NH20AU015
6. Kaushik -1NH20AU014
7. Gokul V G -1NH20AU011
8. Md. Saaim Sabeel -1NH20AU020
9. Shaik Arbaz Ahmed -1NH20AU030
10. Md. Talha -1NH20AU004
11. Md. Riza M S -1NH20AU019
12. Pradeep Ronaldo PR- 1NH20AU022

Department of Electricals and Electronics Engineering :

1. Dayas A Dixen -1NH20EEE029
2. Dony Snehit P -1NH20EEE035
3. Dheeresh Vijay - 1NH21EEE402
4. Harshitha K -1NH20EE039
5. K Jagan-1NH22EE055
6. Srinivas Abhinay Gandla-1NH21EE112

Department of Information Science and Engineering:

1. Gade Guru Saran Reddy – 1NH21IS203

Department of Mechanical Engineering:

1. Kummara Abhishek - 1NH22ME404

Department of Electronics and Eommunication:

1. Preetham chandran-1NH20EC112

THE EVENT

1. PITSTOP

Figure 18.1 Team Working on Bike at Pitstop on Day1

2. Design round

Figure 19.1 Team LIION's Bike Standing in Line up

Figure 2.2 All Teams Holding Design Sheets after Design Inspection

3. Innovation round

Figure 3.1 Presenting our Prototype to the Judges

Figure 3.2 Presenting Simulation Reports to the Judges

4. RACE DAY

Figure 4.1 Rider Geared Up for Race

Figure 4.2 Start line

5. WINNING MOMENT

LIION Racing, a Motorsport team from New Horizon College of Engineering, showcased exceptional prowess by winning awards in three distinct categories:

1. **Best Innovation**: This recognition signifies the team's ingenuity and ability to develop cutting-edge solutions or advancements within the Motorsport domain. Their innovative contributions likely addressed challenges or introduced novel concepts, setting them apart from other participants. Innovations are as follows;

    I. Self-balancing
    The self-balancing system with a steering mechanism operates autonomously when the driver is not present and during low-speed summoning scenarios.

    II. Smart Indicators
    Automatic turn off indicators for two and three wheelers. This operation is achieved using a simple digital compass.

    III. Mild Regenerative Braking
    The mild regenerative braking system in the two wheels captures kinetic energy during deceleration, converting it into electrical energy. This energy is efficiently stored in a capacitor

    IV. Smart Cluster
    A digital cluster which is capable of communicating to the pit crew. Send and receives real-time data, displays vital information on speed, RPM, range, etc.

2. **Best Design (runner-up)**: This accolade underscores the team's dedication to crafting a vehicle with outstanding aesthetics,

functionality, and performance. Being the runner-up in this category indicates that their design was highly competitive and showcased meticulous attention to detail, engineering excellence, and adherence to design principles.

3. **Future Award:** Winning the Future Award suggests that LIION Racing demonstrated forward-thinking vision, strategic planning, and execution. This recognition could stem from their innovative approach to sustainability, incorporation of emerging technologies, or contributions towards shaping the future of Motorsport.

Overall, LIION Racing's achievements in these three categories reflect their comprehensive excellence, from conceptualization and design to implementation and forward-looking strategies, positioning them as a standout team within the Motorsport community.

Figure 5.1

Figure 5.2

Figure 5.3 Success Meet at College

FINANCIAL DETAILS

Total Cost: Rs. 3,89,923/-

Sl.No	Particulars	Cost
1	Team Contribution	3,18,423
2	Sponsorship	44,100
3	College Contribution	18,100
4	Automobile Department Contribution	5,000
5	Crowd Funding	4,300
Total		3,89,923

DETAILS OF EXPENDITURE

Sl.No	Particulars	Cost
1	Registration	30,000
2	Rider's suit (rental)	14,500
3	Manufacturing of Bike	1,70,459
4	Bike Logistics	12,097
5	Team Travel and Accommodation	1,47,890
6	Miscellaneous	14,977
Grand Total		3,89,923