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COIMBATORE - 10

MECHATRON MOTORS
EXPERIENCE THE ELECTRIC

IMAGINE 2 innovate

Dream It... Design It.. Drive It.

EBDC 5.0 RULEBOOK

ALPHA 1KW Category

BETA 2KW Category

A National Level Electric Bike Design Challenge (EBDC'25), Season 5.0

South India's Biggest E-Bike Racing Event

EBDC'2025 Season - 5.0

Date
23 - 26 September 2025

Venue
Sri Ramakrishna Institute of Technology, Coimbatore

Prepared by
Veerakumar S
Event Chairperson

www.srit.org
+91-9688472728

MECHATRON MOTORS

EXPERIENCE THE ELECTRIC

EBDC 5.0 RULEBOOK

APPLICABLE TO BOTH CATEGORIES

ALPHA 1KW Category — SELF DESIGN RETROFITTED

VS

SELF DESIGN RETROFITTED — **BETA 2KW Category**

Prepared by:

Mr.S.Veerakumar

EBDC'2025

Season - 5.0

mechatronmotors@gmail.com

www.mechatronmotors.com

MECHATRON MOTORS
EXPERIENCE THE ELECTRIC

EBDC'2025
Season - 5.0

From

Mr. S. Veerakumar,

Assistant Professor (Sr.Gr),

Sri Ramakrishna Institute of Technology,

Coimbatore-10.

To Sir/ Madam

Subject: Invitation to Participate in South India's Biggest E-Bike Racing Event – EBDC 5.0

Dear E-Bike Innovators and Enthusiasts,

Greetings from Sri Ramakrishna Institute of Technology (SRIT), Coimbatore!

We are thrilled to announce the 5th Edition of the Electric Bike Design Challenge – EBDC 5.0, South India's Biggest E-Bike Racing Event, scheduled to be held from 23rd to 26th September 2025 at our esteemed campus. We are delighted to invite student teams from engineering and polytechnic institutions across India to participate in the 5th Edition of the Electric Bike Design Challenge, Season 5.0.

EBDC has been a platform for innovation, competition, and engineering excellence, bringing together the brightest minds and the most dynamic student teams from across the country. This year's edition promises to be bigger, better, and more electrifying with new challenges, technical inspections, endurance races, dynamic events, and exciting rewards. EBDC 5.0 is not just a race – it's a celebration of sustainable mobility, engineering prowess, and competitive excellence.

EBDC Season 5 will feature:

- ✓ *Static Rounds – Design report, presentations, innovation & business model evaluations.*
- ✓ *Dynamic Rounds – Performance, endurance, acceleration, and maneuverability tests.*
- ✓ *Workshops & Industry Interactions – Knowledge-sharing sessions by industry experts.*

We encourage you to confirm your team's participation at the earliest and be a part of this grand event that celebrates future mobility.

Join us in accelerating innovation. Let the wheels of change roll!

Best wishes,

S.Veerakumar

Mr.S. Veerakumar

P *+91-9688472728*

W *www.mechatronmotors.com*

E *mechatronmotors@gmail.com*

A NATIONAL LEVEL

ELECTRIC BIKE DESIGN CHALLENGE

SEASON 5.0

Dream It...Design It...Drive It.

Organized by

Department of Mechanical Engineering

Powered by

MECHATRON MOTORS
EXPERIENCE THE ELECTRIC

Ready to Race on
September 23-26, 2025

TABLE OF CONTENTS

About EBDC Rulebook

1. The Rulebook of Electric Bike Design Challenge comprising of official rules of EBDC, hereafter will be referred as EBDC Rulebook or Rulebook.
2. It is responsibility of every participating team to get awareness and understanding of rules incorporated in the rulebook. In order to aid better understanding of frequently misunderstood rules, descriptions are given below the particular rules. Either team captain or Vice-Captain shall get in touch with either technical committee or organizer for clarification on rules (if any).
3. Text set in Italic indicates a note or explanation of the rule above to aid its understanding.
4. The various functions and roles are defined as follows:

4.1. Organizer: The specific EBDC team and Board members of EBDC who organize event and all personnel acting on its behalf.

4.2.Participants: The individual (students) who will be taking part in this event and will be registered for this event.

4.3.Team: Group of participants with a team name and one Electric Bike that has been registered for participation at EBDC.

4.4.Team Captain: A participant who has been appointed on the event registration document as primary point of contact for his/her team towards the organizers.

4.5.Vice-captain: A participant who has been appointed on the event registration document as secondary point of contact for his/her towards the organizers.

4.6.Faculty Advisor: A Professional staff member of the education institute who represents the team to the institute.

4.7.Race Director: Person appointed by the organizers, who is responsible to manage and superviseall on track (dynamic) activities.

4.8.Track Marshall: A person appointed by the Race Director to act on his/her behalf, in particular to ensure on track safety and observe on track rule compliance.

4.9.Technical Director: A person appointed by organizing committee, who is responsible to ensure the technical standards and integrity of the EBDC.

Advice from Our Technical Inspectors

The EBDC technical inspection team welcomes you to the most challenging EBDC Design and Racing Series competitions. Our team comprises former motorsports competitors who are now industry professionals, dedicated to advancing E-Mobility and Skill Development. Our primary goals are to ensure a safe competition and to help every team make it to the track.

Top Tips for Building an Electric Bike and Passing Technical Inspection:

- ✓ *Start Early: Everything takes longer than expected.*
- ✓ *Know the Rules: Read all regulations carefully; seek clarification if needed.*
- ✓ *Test Your Vehicle Early: Identify and resolve issues before the event.*
- ✓ *Prioritize Brake Testing: Ensure reliable and efficient braking.*
- ✓ *Design with Compliance in Mind: Meet all qualifying parameters for a smooth inspection.*

KINDLY CHECK WITH THE IMPORTANT GUIDELINES GIVEN BELOW

The new rules and regulations have been updated in the EBDC 5.0 rulebook. Teams participated in previous EBDC 4.0- competition are encourage to check the compliance of the new rules and regulation and get thoroughly acquaint themselves with the new rules as several changes have been implemented.

New changes, modifications and added rules are highlighted as below,

- ✓ Changes in the rules – Text in Green Colour
- ✓ New added rules – Text in Blue colour

SECTION 1

EVENT SCHEDULE & EVENT SUMMARY

S.NO	SCHEDULE	IMPORTANT DATES
1	Registration Starts	10th May 2025
2	Rule Book Release	24th May 2025
3	Registration Ends	30th August 2025
4	Registration Fees Deadline	05th September 2025
5	Phase 1 Report Submission (Design and Innovation Report)	10th September 2025
6	Phase 2 Report Submission (Business Plan and Cost Report)	20th September 2025
7	Inaugural Function	23rd September 2025
8	Static Rounds	23rd & 24th September 2025
9	Dynamic Rounds	25th & 26th September 2025
10	Valedictory Function	26th September 2025

EVENT SUMMARY

S.NO	DESCRIPTION	BETA: 2KW Category	ALPHA: 1KW Category
TEAM DETAILS			
1	Eligibility	Engineering & Polytechnic Students *(Open to All Departments)*	
2	Team Size	8 – 25 Members	8 – 20 Members
3	Vehicle Class	Self-Design & Retrofitted	Self-Design & Retrofitted
REGISTRATION FEES			
1	Engineering Team	Rs.25,000	Rs.20,000
2	Polytechnic Team	Rs.15,000	Rs.12,500
3	Girls Team	Rs.12,500	Rs.10,000
BATTERY SPECIFICATION			
1	Battery Type	Li-Ion Batteries only	
2	Nominal Voltage	48V – 72V	48V only
3	Energy Allowed	1.5KWh – 2.5KWh	Upto 1.5KWh only
MOTOR SPECIFICATION			
1	Motor Type	Any type of AC or DC motors (Hub / Belt / Chain / Mid Drive)	
2	Nominal Voltage	48V – 72V	48V only
3	Rated Power	1000W to 2000W	Upto 1000W only

SECTION 2

ORGANIZATION AND GOVERNANCE

About SRIT:

The Ultimate Destination for Racing Excellence!

Sri Ramakrishna Institute of Technology (SRIT), an Autonomous Institution, and Affiliated to Anna University is one among the most eminent Educational Institutions in Coimbatore district. SRIT is recognized as one of the leaders in Engineering Education, Research and Application of knowledge for the betterment of the society and the country. The college has imprinted a position in the Engineering Education by creating graduates to the industry and the society. Since its inception in the year 2002, the institution has been continuously motivated to make a permanent mark in the education field by creating technocrats, sound in Academics and Value system.

SRIT is one of the seventeen leading institutions managed by SNR Sons Charitable Trust which includes Engineering College, Polytechnic College, Schools, Dental College, Colleges of Pharmacy, Physiotherapy, Arts & Science and Advanced Training Institute. The institution is located in a tranquil environment appropriate for constant learning. It is situated at the outskirts of the city. Well-constructed buildings with state-of-the-art educational aids are spread over the 50 acres with built up area of 65,117 Sq.m.

About the Department of Mechanical Engineering

We are Passionate. Doers in Innovative Engineering Education

The Department of Mechanical Engineering was established in the academic year 2005-06 enrolling 60 students. The department is headed by Dr.B.Chokkalingam, who has vast experience in academics and research. The department comprises of 10 well qualified and experienced dynamic young staffs who hold their master degrees in their interest from renowned institutions. Among them, four members of the faculty have obtained their Ph.D. degree. The member of faculty has published papers in their research domains and two faculty members are recognized as supervisors to guide doctoral candidates in Anna University.

The department has full-fledged and well established laboratory facilities and all the instrumentsused in every laboratory are being calibrated for usage. Internet facility has been enabled in many computers for the faculty to effectively search for useful study materials. Wi-Fi connection has been enabled for them to use their personal computers for research purposes.

The department has well equipped smart class rooms with necessary teaching aids viz., multimedia computers with LCD projectors in order to enable power point presentations for specific/necessarylecture topics. With regard to the technical data, NPTEL videos, Online Class Rooms with EDUSAT Connectivity are available. The department has signed MoUs with the leading organizations/industries in the city namely CODISSIA, KKM Soft, Roots Industries and SALZER Electronics.

About Mechatron Motors

MECHATRON MOTORS LLP is a Student's Start-up unit of SRIT, Coimbatore founded in 2021 who were working towards excellence in two wheeler hybrid technology. We introduced smart hybrid technological services that enable existing two-wheelers to be converted into hybrid vehicles. This forward-thinking approach not only enhances fuel efficiency but also contributes to a greener, more sustainable future.

Driven by a team of highly skilled specialists, Mechatron Motors is committed to delivering excellence in technical support and customer-centric solutions. Their dedication to research and innovation ensures that their hybrid conversion technology meets market demands while maintaining affordability, efficiency, and performance.

With a clear vision to be a leader in the hybrid and electric vehicle sector, Mechatron Motors embodies the spirit of young entrepreneurship, technical expertise, and a deep understanding of customer needs and environmental responsibility.

About Electric Bike Design Challenge (EBDC)

The Electric Bike Design Challenge (EBDC) is the South India's Biggest E-Bike competition organized by Sri Ramakrishna Institute of Technology (SRIT) and Mechatron Motors LLP. Since its inception in 2021, the event has successfully completed four seasons, with the latest being EBDC 2024 (Season 4.0), which took place from September 24-27, 2024, in Coimbatore, Tamil Nadu.

EBDC aims to promote innovation in electric bike design, providing engineering students with a platform to develop and showcase their expertise in electric mobility. Teams are challenged to design and build electric bikes, focusing on efficiency, aerodynamics, battery technology, and overall vehicle performance. The event has played a major role in fostering innovation in electric vehicle technology among students, helping them gain practical experience and recognition in the EV industry. It also provides an opportunity for teams to connect with automotive and electric vehicle industry experts. The competition consists of two main rounds:

- *Static Rounds – Teams present their design, innovation, business plan, and cost analysis.*
- *Dynamic Rounds – Participants compete in various tests, including braking, acceleration, autocross, off-road, hill climb, maneuverability, and endurance*

Evolution over the EBDC Seasons

- *Season 1 (2021) – Focused on introducing students to electric bike design challenges, requiring them to self-manufacture or retrofit bikes using BLDC motors and lithium-ion batteries.*
- *Season 2 (2022) – Expanded with more static rounds, dynamic testing and a broader range of technical evaluation criteria.*
- *Season 3 (2023) – Further refined the event with a detailed technical review process, giving teams valuable industry-level feedback*
- *Season 4 (2024) – The latest season, which pushed boundaries with advanced performance tests and real-world application evaluations*

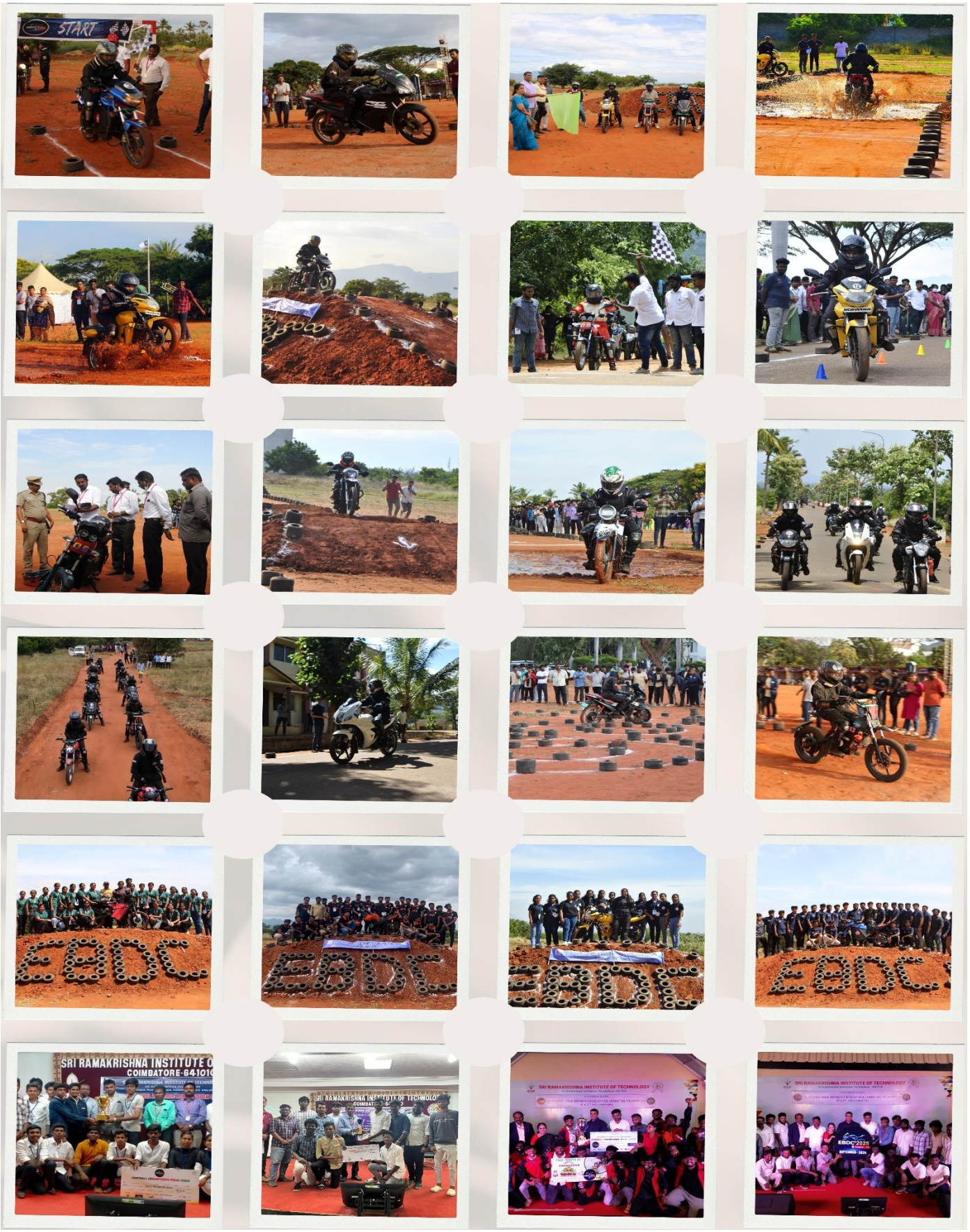
SRIT E-Bike Design Challenge is a competition to explore the theoretical and technical skills of engineering and diploma students. The main motto of this competition is to perform design, analysis and documentation of electric bike. The participating teams have the liberty to exhibit their innovation and new findings allied with the rule book. SRIT provides this exciting platform to budding young engineers to exhibit their innovative ideas into reality. SRIT forum encourage the team members to perform detailed literature survey before starting the design and manufacture of electric bikes.

About Previous Seasons of EBDC

The Department of Mechanical Engineering, in collaboration with Mechatron Motors—a student start-up from SRIT—has successfully organized and completed four consecutive seasons of the Electric Bike Design Challenge (EBDC). These events have witnessed tremendous success, drawing participation from over fifty teams representing engineering institutions across the country. SRIT proudly stands as the only engineering college in South India to have consistently hosted electric bike events over the past four years.

Each season of the Electric Bike Design Challenge has ignited innovation and fostered creativity in the realm of sustainable transportation. From sleek, aerodynamic chassis designs to advancements in battery and motor technologies, the competition has continually pushed the limits of electric bike engineering. Participants have demonstrated exceptional ingenuity, skillfully balancing performance, efficiency, and aesthetics. The diversity and quality of the entries have consistently impressed the judges, underscoring a growing global enthusiasm for eco-friendly mobility solutions. As the challenge continues to evolve, it remains a powerful platform that inspires and cultivates the next generation of electric vehicle innovators and enthusiasts.

GLIMPSE OF PREVIOUS EBDC SEASONS



SECTION 3

RULES AND REGULATIONS

3.1 Rules Authority

The Mechatron Motors shall be the official organizer of the E-Bike Design Challenge and shall be responsible for all the management oversight and application of the regulation for the event. Mechatron Motors team which has been instrumental in promoting motor sports events and ushering a new era of engineers, where they will know, and what practicality in technical world stands for. The Mechatron Motors will act as a launch-pad to accord the seamless endurance of engineers and their prolific inputs. We will craft a world, where knowledge and wisdom in engineering domain will lead to imagination and innovation.

The teams must follow each and every rule, regulations and restrictions given in the rule book. The organizing committee of EBDC have reserves right to modify each and every rule, regulation associated with the competition. Violation of rules by any individual or as a team or representative member may be liable to be penalized severely resulting in or withdrawing or debarring of the team from the competition processed by withdrawal of awards as well.

3.2 Validity of Rules

The rules, regulation and restriction will be the same throughout the event and any amendments will immediately be made known to all the participating teams through emails and the same will be uploaded on the website.

3.3 Rules Compliance

By registering for this event, the team members of the team as individuals, faculty advisors and other personnel of the college/university agree to comply with and will be bounded by these rules, interpretations or procedures issued or announced by EBDC 2025. All team members, faculty advisors and other university representatives are required to cooperate with, and follow all instructions, penalties and results from competition organizers, officials and judges.

3.4 Right to Impound

The organizing committee of EBDC 2025 reserves the right to impound any participating vehicle at any stage of the event for detailed inspection, verification, or safety analysis. This may include scrutiny of design integrity, electrical safety, or compliance with technical regulations. Vehicles held for impound will remain under the custody of the technical inspection team until clearance is granted. Teams must cooperate fully during the impoundment process. Failure to comply may result in disqualification or penalization.

3.4 Official Announcements

All the official announcements and information regarding the competition will be displayed on the official website of the event organizers. Our official website is www.mechatronmotors.com or www.srit.org. After completion of registration, important information will be emailed to the respective team mail id.

3.5 General Authority

EBDC organizing committee reserves the sole rights to revise the schedule or awards or rewards of the competition and interpret or modify the competition rules at any point of time and in any manner that is, in their sole judgement, required for the efficient operation of the event or the EBDC as a whole.

The organizers many re-conduct a certain round or event in case of any disputes, confusion, failure in maintaining strictness or for any other reason as their sole discretion without being questioned.

3.6 Documents Submission

The team members are advised to submit the documents in prescribed schedule to avoid delaysin publishing the points and notifications. If any team wants to extend time due to their university examinations and or other academic activities, please email a request mail through the team advisor duly forwarded by the head of the department/head of the institution stating the actual reason for requesting time extension.

3.7 Participating in the Competition

The registered team, team captain, members, participant individuals, faculty advisor and college representatives of colleges and universities who are all present on competition venues are considered as participating in the competition. If earlier departure from the competition venue due to problem in the bike/ medical reason/ not cleared in the technical inspection or any other personal and official or non-personal reason will be considered as earlier withdrawal by the team from the competition. At any circumstances, the registration fee is not adjustable or refundable.

Teams which do not appear in –

1. Static Round
2. College level technical Inspection
3. Onsite Technical Inspection and Dynamic round within stipulated time shall not be eligible to appear in the next level of the event.

3.8 Misbehavior

Misbehavior activity in any form of the registered team, individual or representative of the college/university will receive a penalty of points.

3.9 Arguments with Officials

Any form of argument, disrespectful behavior, or non-cooperation with event officials, volunteers, or organizing committee members will be treated as a serious violation of the event code of conduct.

3.10 Smoking and Illegal Materials

Alcohol, illegal drugs, weapons or other illegal materials are prohibited on the event site during the competition. This rule will be in effect during the entire competition. Any violation of this rule by a team member will cause the expulsion of the entire team. This is applicable to all the team members and faculty advisors. Any use of drugs or the use of alcohol by an underage individual will be reported to the local authorities for prosecution, if found.

3.11 Bike Shipping

The teams must ensure that their shipping agency or Freight Forwarder or Commercial carrier complies with all rules laid by the government for Inter-State Transportation. It is the responsibility of teams to ship the vehicle at the proper time so that it reaches the event-site before the start of the event. Teams must keep proper care during transport to avoid any damage to the bike. Proper care must be taken while selecting the mode of shipping (Train/Truck etc.).

3.12 Penalties

Violation of Rules:
Penalty of 100 points imposed.

Misbehavior/Arguments with officials or volunteers:
A penalty of 100 points.

Tampering with TI sticker or making restricted changes in vehicle after TI:
A penalty of 100 points.

Others:
EBDC organizers have the rights to modify the penalties listed in the various events.

3.13 Remonstration

SRIT and Mechatron Motors is recognized the students involvement and efforts to manufacturing the bike by spending hard and valuable days and hours. The EBDC organizers will make nevertheless effort to review all questions and disputes to resolve their problems quickly and efficiently.

3.14 Protests:

- ✓ EBDC organizing committee understands all the efforts students put to manufacture an Electric Bike and bring it to the competition, so we will make every effort to fully review all questions and resolve the problems, if any. At the same time, we have zero tolerance to any kind of indiscipline.
- ✓ At first the team Captain/ Faculty Facilitator must approach the organizer and inform informally regarding any objections & questions about scoring, judging, policies or any official action.
- ✓ If the problem is not resolved, then the team can fill the Protest Form attached with the file provided to team during Induction and submit the form in the Control Room.
- ✓ Only team captain or authorized acting captain (in absence of captain during dynamic round) / faculty advisor is permitted to file a protest in written before 30 minutes of end of event related to which protest is to be filed. The protest must be filed only if it has caused any direct or considerable damage to your Team or else severe action will be taken against the team.

3.15 Loopholes:

It is virtually impossible for a set of rules to be so comprehensive that it covers all possible questions about the vehicle's design parameters or the conduct of the competition. Please keep in mind that the safety remains of paramount importance during EBDC, so any perceived loopholes should have resolved in the direction of increased safety/concept of the competition.

SECTION 4

PARTICIPANTS INFORMATION

4.1 Eligibility Criteria

- ✓ EBDC Season 5 is an exclusive Engineering Design Competition open only to Undergraduate and Diploma students (1st to Final Year) from any branch of engineering.
- ✓ This ensures a focused platform for young engineers to showcase innovation, technical creativity, and practical design skills.

Educational Qualification

- ✓ All team members must be currently enrolled as degree-seeking undergraduate or diploma students from any department in a recognized college or university.
- ✓ Students who have graduated within the last seven (7) months prior to the competition are still eligible to participate, provided that they do not take on major roles such as Team Captain or Driver or Co-Driver. *(Exception for female participants from 2025 passed out students)*

  Instead, they may participate in a technical role or supporting role, helping to guide and support junior team members in the proper direction. (Exception for female participants from 2025 passed out students)

4.2 Team Entry Requirement

Guidelines for selecting team name and logo for team:

Team Name

- ✓ No two teams are allowed to have the same team name.
- ✓ In case of any dispute, the team using name from past EBDC events will be given authority to use the name.
- ✓ If any two teams use the same name then the team registered first with full payment will retain the name and other team will have to change the team name.
- ✓ A meaningful and inspirational team name is required to distinguish the team in the competition.
- ✓ The chosen team name should not hurt the sentiments of any person/religion and should not have any religious word.
- ✓ The chosen team name should not criticize any social action of any group of people or an Individual.

Team Logo

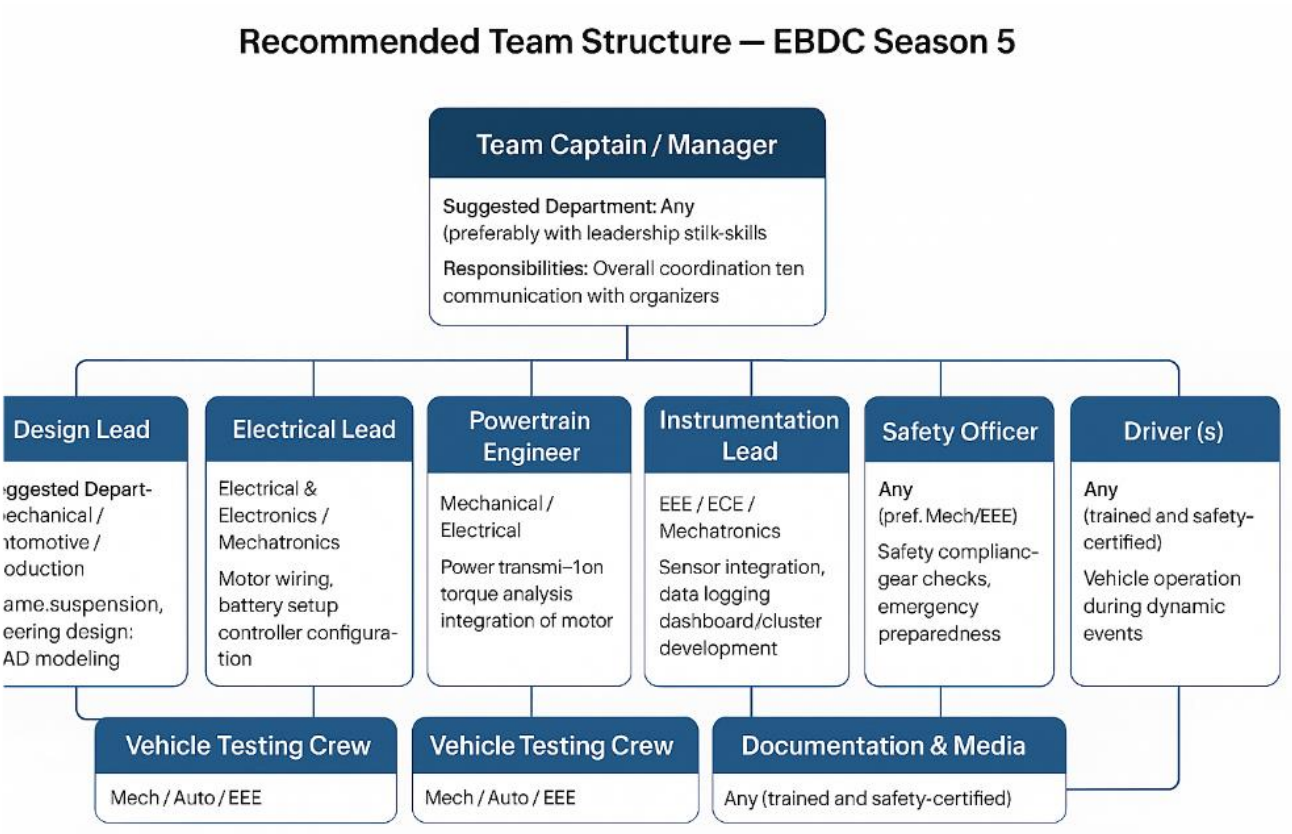
- ✓ Each team must submit an original logo that represents their team's identity, vision or technical spirit.
- ✓ Teams Logos must not infringe any copyrights or use elements from copyrighted brands or organizations
- ✓ The logo should reflect the engineering mindset, innovation, sustainability, or inspiration behind the team.

Team Members

- ✓ Teams can have members from different colleges too. But they will represent only one of the college/ organization as per their mutual agreement.
- ✓ It is not necessary for students to represent their college, they can also represent other organization that is sponsoring/ supporting the team.
- ✓ If the team representing organization means, they should submit NOC from their organization. Age limit for all the participants should be less than 24 years of age.
- ✓ In case the team is seeking help from some industrial professional/experienced personals, then it should be purely for the advisory purpose. Design of the vehicle should be done only by the team members.

Team Size

Category	ALPHA: 1KW	BETA: 2KW
Team Size	8 – 20 Members	8 – 25 Members



Team Mail ID

- ✓ Teams are supposed to have their unique mail ID.
- ✓ Create your team mail Id in your own interest which should include your team name.
- ✓ Any query or communication with EBDC is to be done through this mail ID only.

Note: Any communication done by personal email ID or ID other than mail ID will not be entertained once the team has been registered. Queries will be resolved and replied within 48 hours. If you feel like your query has not been solved then you can contact us using the number given.

***Team Advisors

TEAM ADVISORS

- The inclusion of a Faculty Advisor, Industrial Advisor, and Alumni Advisor is mandatory for EBDC Season 5.
- Each team must designate one individual for each of these advisor roles.
- Their involvement ensures technical guidance, industry alignment, and experiential mentorship.
- All three advisors must sign the team registration form prior to submission.

FACULTY ADVISOR	INDUSTRIAL ADVISOR	ALUMNI ADVISOR
Role: Academic & Technical Guidance	*Role: Industry Alignment & Standards*	*Role: Mentorship & Strategic Support*
• Monitor and mentor the team's technical progress. • Ensure alignment with academic goals and institutional standards. • Guide in design methodology, simulations, and validation. • Facilitate access to campus resources and labs. • Support in documentation and presentation reviews.	• Offer insights into industry trends and standards. • Guide product-market fit and real-world feasibility. • Suggest design improvements based on industrial experience. • Assist in aligning the project with current automotive practices. • Connect the team with industrial contacts or suppliers if needed.	• Share experience from previous EBDC or similar competitions. • Help with team management, event planning and strategy. • Advise on tackling technical & time-management issues. • Motivate the team and boost morale through mentorship. • Act as a bridge between student teams and past learnings.

Note: In case of any changes in Team Leader / Team Advisors / Team name, they have to send an application with the details and signature of Previous Team Leader/Faculty Advisor and current Team Leader/Faculty Advisor from the Team Mail Id.

4.3 Driver's eligibility

For EBDC 5.0, here is the updated driver's eligibility criteria, incorporating the mandatory female driver requirement due to the Female Endurance Round in the dynamic events:

TEAM DRIVERS ELIGIBILITY

Eligibility	Main Driver	Co-Driver	Female Driver
Driving License	✓	✓	✓
Accident Insurance	✓	✓	✓
Fitness Certificate	✓	✓	✓
Aadhar Card	✓	✓	✓
College ID Card	✓	✓	✓
Driver Suit	Only one driver suit per team is sufficient for all drivers.		

Teams may use second SFI-rated safety gear or a certified rider's jacket with equivalent protection for female driver.

******Important Note******

- ✓ Teams failing to include a female driver will be disqualified from participating in the Female Endurance event and may lose points or eligibility for overall rankings.
- ✓ The female endurance round will be evaluated equally with other dynamic rounds, and its performance will directly impact final scores.
- ✓ *A Learner's License Record (LLR) will be considered valid only for diploma (polytechnic) students, subjected to approval by the EBDC Organizing Committee.*
- ✓ *All drivers, including polytechnic students, must submit a fitness certificate from a registered medical practitioner.* The certificate must clearly state that the student is physically fit to participate in endurance and dynamic events.
- ✓ All eligibility documents (license, LLR copy, medical certificate, fitness certificate, gear checklist) must be submitted during the Pre-Tech Inspection.
- ✓ Final list of approved drivers, including those with LLR, will be published after document scrutiny by the EBDC Technical Team.

Special Condition: Colleges Participating in Both ALPHA and BETA Categories

If a same college registers two separate teams under the 1kW and 2kW categories, the following rules must be strictly followed:

1. *Separate Team Members:*
   - ✓ The core team members of the 1kW and 2kW categories must be completely different.
   - ✓ No student can be part of both teams.
2. *Separate Drivers:*
   - ✓ Each category must have its own unique set of drivers.
   - ✓ No driver is allowed to participate in both 1kW and 2kW events.
3. *Separate Team Advisors:*
   - ✓ Each team must have a different faculty advisor, industrial advisor and alumni advisor.
   - ✓ A single advisor cannot mentor both category teams from the same institution.
4. *Separate Riding Gears:*
   - ✓ Both teams must carry their own complete set of driver safety gear.
   - ✓ Sharing of riding gear between teams is strictly prohibited.

Important Note

- ✓ Violating any of the above criteria may lead to disqualification of both the team(s).
- ✓ Non-compliance with these rules may lead to penalty, disqualification, or score deductions.
- ✓ All documents and gear will be verified during the Technical Inspection Round.
- ✓ Female Endurance Round performance will directly impact the team's dynamic event scoring.

Permission from Institute

- ✓ Submission of permission letter of Institute is the sole responsibility of the participating team, if not followed this may lead penalizing or disqualification of the team from the competition.
- ✓ Teams should take prior permission from the institute /university to allow them to attend the event for 4 days and a copy of the same is to be submitted to EBDC organizing committee.
- ✓ College ID card is mandatory for all the team members and it will be asked for verification at any time of the event.

SECTION 5

REGISTRATION PROCESS

Registration Process

Registration for a National Level Electric Bike Design Challenge is a threefold process which consists of following stages:

- ✓ Online Registration
- ✓ Registration fee payment
- ✓ Team details submission

5.1 Online Registration

All teams must register their details through the online registration portal available on the official websites:

www.mechatronmotors.com

www.srit.org

Teams must complete online registration to be eligible for further processes. Upon successful registration, a unique Team ID will be issued.

5.2 Registration fee payment

Once the team receives a confirmation email from the organizing committee, they are required to pay a non-refundable registration fee within 15 working days as per below criteria.

S.NO	DESCRIPTION	BETA: 2KW Category	ALPHA: 1KW Category
		Team Size: 8 - 25	Team Size: 8 - 20
1	Engineering Team	Rs.25,000	Rs.20,000
2	Polytechnic Team	Rs.15,000	Rs.12,500
3	Girls Team	Rs.12,500	Rs.10,000

**** Rs.500 extra per member if the team exceeds above mentioned team size.*

****Registration fees are non-refundable and will not be transferred to any subsequent year's competition.*

Mode of Payment:

Online:

- ✓ Money transfer through internet banking as per account details given below:
- ✓ UPI ID: 9688472728@ybl
- ✓ GPay / Phone pay / Paytm: 9688472728 (Veerakumar Sengottaiyan)

Offline:

Teams can deposit fees by following modes:

- ✓ NEFT from any bank
- ✓ Cash deposit via challan

BANK ACCOUNT DETAILS	
Account Name	VEERAKUMAR SENGOTTAIYAN
Account Type	Savings Account
Account No	924010000255369
Bank Name	Axis Bank
IFSC Code	UTIB0003301
Branch Name	Ganapathy, Coimbatore.

****After offline payment, teams must email the proof of payment to mechatronmotors@gmail.com.*

Registration Fees confirmation

- ✓ Registration fees will be confirmed within 24 hours of payment.
- ✓ If the payment is followed by a Bank Holiday then confirmation will be done after 48 hours.

5.3 Team details submission

After the team registration and fees payment, organizing committee will send the team registration form to the team mail id. The team should take printout of the registration form and fill all the team members' details. The scanned copy of filled registration form should be send to the event official mail mechatronmotors@gmail.com which is duly signed by team captain, all team advisors and HOD/Principal of the institution/university.

SECTION 6

VEHICLE DESIGN REQUIREMENTS

EBDC 2025 emphasize strengthening participants' core engineering skills by encouraging them to independently design and document their electric bikes. All design activities must be carried out solely by student team members without direct assistance from professional engineers or industry personnel. However, students are allowed to refer to academic resources, technical literature, and seek consultative guidance from professionals, as long as the final work is their own. A Design Log Sheet must be maintained to document progress on design activities listed in the official points table. This log should include sketches, CAD models, calculations, and team member contributions. The design will be evaluated for originality, technical soundness, and completeness during static event rounds.

The Event will be in two classes (applicable for both Alpha & Beta):

1. *Retrofitting Class – The inclusion of this segment of retrofitted bike is to encourage innovation in conversion technologies, pushing the boundaries of efficiency and accessibility in transforming traditional motorcycles into electric-powered ones. Promotes sustainability by extending the lifespan of traditional motorcycles through electrification.*
2. *Self-Manufactured Class – The purpose of this segment is to manufacture an electric motorbike which in future meets the commercial requirements that can help the society to incline towards the E- Mobility. By encouraging participants to design and fabricate their electric bikes from scratch, the challenge fosters a spirit of entrepreneurship, creativity, and self-reliance.*

The idea of integrating both segments in the EBDC embodies a comprehensive approach to innovation, sustainability, and inclusivity. Together, these segments foster a vibrant ecosystem of diverse solutions, ranging from grassroots DIY projects to cutting-edge innovations, all contributing to the advancement of electric mobility. This can fulfil the needs and aspiration of young generation, who are willing to contribute and use eco-friendly green mobility solutions for the greater good of the society and the environment.

6.1 General Design Requirements

Retrofitting Class

- ✓ It's mandatory to keep the dimensions of the bike same as they were before retrofitting.
- ✓ The battery pack, motor and any other innovative conclusions should not change the length, width and height of the bike.
- ✓ Maximum width of the bike will be measured from end to end points of handle.
- ✓ All parts of the bike including the driver should lie within the end to the end points of the handle.
- ✓ The maximum weight of the retrofitted bike must not exceed 150kg.

Self-Manufactured Class

Vehicle Dimensions

S.NO	PARAMETER	ALPHA: 1KW	BETA: 2KW
1.	Overall Length	1500 – 1800 mm	1800 – 2050 mm
2.	Overall Height	750 – 1150 mm	1100 – 1550 mm
3.	Overall Width	600 – 750 mm	650 – 850 mm
4.	Wheel Base	1150 – 1350 mm	1300 – 1550 mm
5.	Ground Clearance	150 – 250 mm	150 – 300 mm

**It is compulsory to have a paddock stand for both category vehicles.*

6.2 Frame Restrictions

Retrofitted class:

- ✓ Teams are instructed to use the same frame as availed from the bike.
- ✓ All welding points in the frame should be intact and damaged frames will be disqualified onspot.
- ✓ The frame will be strictly inspected in the technical inspection.
- ✓ Bodyworks can be of any material and ensure good aesthetics.

Self-Manufactured class:

- ✓ Teams are free to use any type material for design of AISI or ASTM standard seamless pipe for fabrication.
- ✓ Teams are required to design their own chassis with tubular frame only.
- ✓ Tubular frame must be used with minimum outer diameter of 25mm and minimum thickness of 1.5mm.
- ✓ The frame must contain the motor mounting location, steering head location, battery mounting space, rear suspension linkage.
- ✓ The footrest should not be lower than the bottom-most frame part.
- ✓ There must be either a side stand or a center stand.
- ✓ Body panels must be easily removable to access the other components

6.3 Frame Material Specifications

Retrofitted class:

- ✓ Teams must maintain the structural integrity of the original frame while accommodating electric components.
- ✓ Certificates should have the date of testing and it should be after the purchasing date. Testing should be conducted from certified laboratory only (NABL Accredited Lab)
- ✓ Failing to produce the certificate at the time of inspection, Technical Inspector's judgment will be the final judgment whether to pass the vehicle with or without Penalty.

Self-Manufactured class:

- ✓ Teams can use any material – steel/aluminum/carbon fiber for the frame.
- ✓ In the case of steel, minimum carbon percentage should be 0.1%.
- ✓ Teams need to produce the material composition and strength test certificate from certified labs (NABL Accredited Lab) with the GST purchase bills.
- ✓ Failing of producing the certificate at the time of inspection, Technical Inspector judgment will be the final judgment whether to pass the vehicle with Penalty or disqualify.

6.4 Suspension System

Retrofitting Class:

- ✓ Teams are allowed to use the same suspension system of the bike.
- ✓ The mounting of the front suspension should be done according to the rake/caster angle of the bike.
- ✓ Teams are allowed to use either mono-shock or twin shock suspension at the rear as acquired from already purchased bike.

Self-Manufactured Class:

- ✓ Teams are allowed to use a pre-fabricated suspension system of any bike at front as well as at the rear.
- ✓ The mounting of the front suspension should be done according to the rake/caster angle of the bike.
- ✓ Teams can customize both the suspension system.
- ✓ Front: In the Front, there should be double shock telescopic hydraulic Suspension.
- ✓ Rear: Swing arm with mono suspension or dual swing arm suspension can be used.

**** If any team wishes to change the front or the rear or both suspensions, they have to mention thesame in the design report which will include the suspension design, CAD Model, Dynamic simulations and how it differs from bikes original system.*

6.5 Steering System

- ✓ Teams are allowed to use a pre- fabricated bike handle in both the classes.
- ✓ Teams can modify the handle according to their requirements in both the classes, but they have to mention the modification in detail in the Design Report including its methodology.
- ✓ The turning angle must be limited with stoppers on both sides.
- ✓ These stoppers should be made of nylon, aluminum or materials of similar hardness. Neither the chassis, nor any other part of the prototype may act as a steering stopper.
- ✓ The minimum turning angle of the steering must be 15^0 measured on either side of the longitudinal axis of the prototype.
- ✓ The allowed rake angle is 22^0 to 32^0 (2KW) & 22^0 to 30^0 (1KW)
- ✓ Steering Axis Inclination should have offset with the front wheel center.
- ✓ This system must have positive steering stops that prevent the steering linkages from locking up.

6.6 Braking System

- ✓ The braking system must be installed on both the wheels (Front and Rear).
- ✓ Teams are allowed to use any braking system like drum brake or disc brake on rear wheel.
- ✓ The brake should not be wire actuated. It can be actuated through mechanical linkage.
- ✓ There should be minimum 1 disc brake in the vehicle (2KW).
- ✓ One brake should be hand operated and other should be foot operated as in normal bikes (2KW).
- ✓ Disc brake should be of hydraulic actuation. Wired actuation is strictly prohibited.
- ✓ The brake light (Red colour) must be used for showing the brake's actuation for both front and rear.
- ✓ Using LED light strips for brake lights is prohibited

6.7 Bike Seat

- ✓ Self-Manufactured class must use pre- manufactured seat and its mounting should be according to the seat.
- ✓ Retrofitting class must use same seat. In case if the seat is damaged in Retrofitting Class they can alter the seat but it should be of same bike

6.8 Tyres & Wheels

S.NO	PARAMETER	ALPHA: 1KW	BETA: 2KW
1.	Diameter of the Wheel	10 – 12 Inches	16 – 19 Inches
2.	Width of the wheel	2.5 – 3.5 Inches	7 Inches

6.9 Dashboard System

- ✓ Team have to modify the dashboard and it should be rigidly mounted.
- ✓ Dashboard should display readings of the Speed, Batter Level Indicator (in % or bar) and Battery Temperature, Speed Modes, Turn Indicators, High Beam & Low Beam Headlight Indicator and Smoke Detection Indicator.
- ✓ Teams are allowed to use a Tablet, Mobile or any other Digital Integrated Dashboard in theBike.
- ✓ Maximum dimensions of the dashboard: * Length – 8 inch, * Width – 6 inch.
- ✓ Teams should take care the dashboard should not exceed beyond headlight.
- ✓ The dashboard should be visible and accessible to the rider easily.

6.10 Others

- ✓ Teams must use two mirrors attached to the handle bar so that the rear view can be clearly visible to the driver. It is mandatory to utilize both front and rear mudguards.
- ✓ There should be indicator lights on front and rear for turning left or right. The light emitting must be of orange colour.
- ✓ An audible horn must be fitted permanently to the bike. It must be capable of giving sufficient audible warning of the presence of vehicle.
- ✓ Head light & Tail light must be connected to Li-Ion battery only. Auxiliary Battery (12V) is prohibited.
- ✓ There should be a separate switch for Head light mounted on handle. It should be able to on high beam and low beam light.
- ✓ The vehicle should be equipped with the main stand or side stand for the support.
- ✓ The brake light (red colour) must be used for showing the brakes actuation.
- ✓ Exposed high-speed final drive train equipment such as sprockets, gears, pulleys, torque converters, clutches, belt/chain drives and clutch drives, must be fitted with chain guards / scatter shields as a failsafe system in the case of a failure.
- ✓ All threaded fasteners utilized in the driver's cell structure, steering, braking and mountings must meet or exceed, SAE Grade 5, Metric Grade (M6 or M8) and/or AN/MS specifications.
- ✓ The team must use lock nut in the wheel assembly, steering mounting, Power unit, transmission mounting, etc. The vehicle must have three to five threads visible past the nut.
- ✓ It is mandatory to use only metal fast nuts and bolts for body works etc. Use of any type of plastic or metal tie (such as zip tie, wrap tie, wire etc.) for fixing body parts or any components of bike are strictly not allowed.

6.11 Electrical System

General Electrical System Overview:

- ✓ The tractive system of an electric Bike is the system that provides power to the Bikes wheels, allowing it to move.
- ✓ In an electric Bike, the tractive system includes the motor, controller, battery, and other components that work together to provide the necessary torque and speed to the wheels.
- ✓ *For electrical innovations, the power supply must be taken from the battery Pack only.*

6.12 Battery

Battery Specifications:

S.NO	DESCRIPTION	BETA: 2KW Category	ALPHA: 1KW Category
BATTERY SPECIFICATION			
1	Battery Type	Li-Ion Batteries only. (Any Cell Chemistry)	
2	Nominal Voltage	48V – 72V	48V only
3	Energy Allowed	1.5KWh – 2.5KWh	Upto 1.5KWh only

Considerable Factors for Battery:

- ✓ Lithium ion battery pack must have a BMS by default and the same rated for EV application providing proper cell balancing voltage protection, over current protection, short circuit protection.
- ✓ The technical details along with data sheets of lithium ion cells and BMS used in the battery packs must be submitted along with design report.
- ✓ The battery pack should cover all the cells and BMS in a proper manner without exposing any of the internal components to dust or water entry
- ✓ The Battery Management System (BMS) must incorporate protection features including overcharge and over-discharge protection during both charging and discharging, overcurrent protection, over-temperature and under-temperature protection, short circuit protection, reverse polarity protection, and cell balancing functionality.
- ✓ Team are allowed to use pre- manufactured battery pack available in the market, Self-manufactured or assembled battery pack is intended to use by the team needs to provide the IP 67 certificate and battery health certificate at the time of Technical Inspection from authorized certifying agency.
- ✓ Battery pack should be IEC 60529 IP67 certified.

- ✓ Battery pack should meet all weather conditions to ensure that it should not fail.
- ✓ If team is using old battery pack, you need to submit the Battery Health Certificate.
- ✓ The battery cover should be made up of rigid plastic/ glass fiber/ sheet metal, with an insulating coating.
- ✓ The casing of the battery should be fixed/ welded/ fastened (using lock nuts) with the chassis.
- ✓ The team may implement a forced convection system wherein atmospheric air is directed into the battery pack enclosure to facilitate cooling. Liquid cooling of battery pack is prohibited.
- ✓ Battery must be able to provide power to all safety items (Brake Light, Indicator Lights, Horn) for the duration of entire event. The team is not permitted to swap out the battery pack throughout the event.
- ✓ Battery enclosure must be insulated, robust, vibration-resistant, Fire-retardant and IP-rated
- ✓ Use Anderson, XT90, or similar connectors with locking mechanisms. All terminals must be properly insulated.

****Emergency Handling****

In case of overheating or swelling:

- ✓ *Disconnect power immediately.*
- ✓ *Move the battery to a safe, isolated zone.*
- ✓ *Use Class D or ABC fire extinguisher if flames occur.*
- ✓ *All team members must be trained in battery fire protocol.*

6.13 Charging System

- ✓ Team can have their own charging system design but charger input voltage is fixed at 230V 50Hz AC.
- ✓ Charging current can be set according to design needs (6A – 15A allowed).
- ✓ A charging system/charger should be rated for the battery pack according to engineering specifications and should be rated for the battery and insulated.
- ✓ Teams must have a single point accessible charging point on the bike for charging the batteries at either side of the bike. No on board charging systems are allowed.
- ✓ The vehicle /charger should indicate user if any charging operation is underway through LED light.
- ✓ The charger should have over voltage protection, over current protection, short circuit protection, reverse protection.
- ✓ Proper plugs should be used for connecting the Li-ion battery charger to the battery pack there should not be loose running wires.

6.14 Motor

S.NO	DESCRIPTION	ALPHAI: 2KW Category	ALPHA: 1KW Category
MOTOR SPECIFICATION			
1	Motor Type	Any type of DC motors (Hub / Belt / Chain)	
2	Nominal Voltage	48V – 72V	48V only
3	Rated Power	1250W to 2000W	Upto 1000W only

- ✓ No constrains on RPM and Torque
- ✓ The motor and drive train should be mounted properly (use bolts and nuts)
- ✓ On the original bill the wattage and voltage of motor must be clearly mentioned.
- ✓ The Motor must be manufactured as per the IEC 60529 IP67. Teams are required to submit the certificate of IEC 60529 IP67 from their vender.
- ✓ Controller: Teams are free to use any type of controller suited for the motor but have to show the specification sheet of the controller.
- ✓ Motor and Motor Controller should be tuned properly.
- ✓ The controller must comply with all the prescriptions that may apply to it in these Technical Regulations.
- ✓ Controller must provide over & low voltage protection, over temperature protection, over current protection & brake protection to motor.
- ✓ The controller voltage should match the voltage of battery and motor. The controller current rating should be lower or equal to the continuous current output of battery.
- ✓ The system should be designed in such a way that all the components are properly tuned
- ✓ It is absolutely forbidden to manipulate the motor. Any changes in the motor will lead to disqualification on the spot

6.15 Transmission

- ✓ It is mandatory for the teams to use a rear wheel drive.
- ✓ Transmission: Teams are free to use any type of transmission (Hub / Belt / Chain)
- ✓ The transmission must be clearly visible at the time of onsite design evaluation.
- ✓ The transmission can be chain drive, belt drive or gears
- ✓ Any transmission and drive train may be used. Either of chain or belt drive can be installed.
- ✓ There is no limitation with the sprocket ratio installed in the bike.
- ✓ Teams are allowed to makechanges to the sprocket ratio.

6.16 Kill Switch

- ✓ Teams must install two kill switches. Both the kill switches should be red in colour.
- ✓ One switch must be located in such a way that it is easily accessible to the rider.
- ✓ The other should be at one side of the vehicle and must be clearly visible from the outside.
- ✓ The kill switches must disconnect all the power sources except the head light and the brake light.
- ✓ The head light and the brake light must be operated regardless of the kill switch setting.
- ✓ The kill switches must be mounted rigidly.
- ✓ Small stickers indicating "KILL SWITCH" must be attached near the kill switches.

6.17 Throttle

- ✓ The throttle installed in the bike must be retractable.
- ✓ The throttle must be covered with a proper grip comfortable enough for the rider's actuation.

6.18 Fusing

- ✓ Since the battery has very low internal impedance, instantaneous high currents can flow which can seriously damage the battery. The circuit on the HV side must be protected by at least one fuse.
- ✓ The battery pack must have a proper short circuit protection. Teams should use good quality working Mini circuit breakers (MCB) for protecting it from high loads.
- ✓ The current rating of MCB should not be greater than the cable current carrying capacity. It should be greater than or equal to the maximum current that the system is carrying. Do not use a MCB lower than the total current of the circuit.
- ✓ The current rating of fuse should be greater (15% to 20%) than the current carrying through the wire on which it is installed.
- ✓ The current rating of the MCB should be equal to or greater than the Motor Controller rating.
- ✓ Teams should mandatorily use an MCB (mini circuit breaker).
- ✓ The Team should Mandatory fix a MCB and a standard Fuse between the Main Primary Accumulator/ Battery and controller.
- ✓ The power of the Motor must be drawn from the battery through a MCB & Fuse only

6.19 Wiring

- ✓ Wiring should not go below the chassis. Wiring should not be going through metallic pipes.
- ✓ It should be properly covered with insulated plastic pipe.
- ✓ Proper insulation must be there on both the terminals of the battery.
- ✓ The team should choose the orange color to differentiate the Primary Accumulator line or High voltage line with the GLV line (<12V DC).

6.20 Adaptive Speed Limiting *(Mandatory to BETA Teams: 2KW Category)*

- ✓ Teams must operate their vehicle in different modes to demonstrate the functionality of the speed limiter system.
- ✓ The actual performance of the speed limiter must be showcased during the test.
- ✓ Teams must select a mode and accelerate the vehicle to its maximum limit within that mode.
- ✓ While at full acceleration, the power output must not exceed the predefined maximum power limit.
- ✓ The dashboard must clearly display the vehicle's speed in each selected mode.
- ✓ ***The dashboard must also indicate the active mode of the vehicle in real-time.***
- ✓ ***Installing a Mode-Based Speed Limiter is mandatory for all teams.***

6.21 Circuit Diagrams of the Electric Bike

There are mainly two types of circuit involved in any Electric Bike.

a. *HV Circuit (High Voltage, Tractive System) – Primary Accumulator as Power Source. (Above 40v DC)*
b. *LV Circuit (Low Voltage, Shutdown Circuit) - Auxiliary Accumulator as Power source. (Below 40v DC)*

At the time of design Presentation, it is Mandatory to all the Teams to show their detailed HV & LV circuit diagram specific to your connection in E-Bike to the Presentation committee

6.22 Others

- ✓ All components of the HVS must be located inside a reinforced structure that ensures their integrity in case of a crash
- ✓ A red warning light that will remain on while the HVS is active shall be installed, while the contactor of the battery is closed.
- ✓ It should be installed in such a way that it should be visible to rider in any case.
- ✓ It is compulsory to place clearly visible labels indicating danger on housings or areas near the components working with High Voltage (HV). These labels must include the text "HIGH VOLTAGE".
- ✓ The battery pack must have a proper short circuit protection. Teams should use good quality working Mini circuit breakers (MCB) for protecting it from high loads.
- ✓ Battery pack must contain a temperature sensor and smoke sensor whose readings must be accurately indicated on the dash board
- ✓ Proper joining method should be used for wires, simple plastic tapes, insulation tapes are not allowed, wires should be routed through the chassis or non-moving member and should be clamped properly.
- ✓ Vehicle with open wires presented to the technical inspection will be disqualified
- ✓ The wire length must be exact, and therefore it is not allowed to roll excessive wire lengths.

SECTION 7

RIDERS SAFETY GEAR

7.1Mandatory Safety Gear

All riders must wear the following safety gear during all practice sessions, technical inspections, and competition events:

- ✓ Certified full-face helmet
- ✓ Racing suit
- ✓ Gloves
- ✓ Riding boots (covering ankles)
- ✓ Knee and elbow guards
- ✓ Neck Support
- ✓ Balaclava

7.2 Prohibition of Gear Interchange

Interchange of rider safety gear between teams or across different competition categories is strictly prohibited. Any such violation will result in the imposition of severe penalties, including but not limited to time penalties, loss of points, or disqualification, as determined by the event officials.

7.3 Dedicated Safety Gear for Multi-Team Participation

If two different teams are participating under separate competition categories, each team must provide a separate and dedicated set of rider safety gear, including driver suits. Sharing of driver suits or any other protective equipment between such teams is not permitted under any circumstances.

7.4 Inspection and Compliance

All safety gear will be inspected and approved by the Technical Committee before the commencement of the event. Random checks may also be conducted during the event. Non-compliance at any stage will result in immediate penalties as per Section 10.0 – Event Penalty Guidelines.

7.5 Penalties for Gear-Related Violations

- **Sharing of safety gear between teams/categories:** 100 Points for both teams involved.
- **Failure to present gear for inspection on-time:** 50 Points, based on severity.
- **Use of non-certified or damaged gear:** Disqualification from the event.

RIDERS SAFETY GEAR

S.NO	SAFETY GEAR PART	DESCRIPTION	SPECIFICATION
1	Rider's Suit	A fire resistant one piece suit, made from a minimum of 1 layer that covers the body from the neck down to the ankles and the wrists	➢ SFI 3-2A/1 (or higher) ➢ FIA Standard 1986
2	Underclothing	It should cover the rider body completely from neck down to ankles and wrists	fire resistant underclothing (long pants and long sleeve t-shirt)
3	Helmet	A well- fitting closed face helmet	SNELL, FIA, SFI & DOT
4	Balaclava	It should covers the rider's head, hair and neck	It should be fire resistant
5	Neck Support	The neck support must be a full circle (360°)	SFI Rated
6	Knee Pads and Elbow Pads	Proper knee and elbow pads must be used.	Each One Pair
7	Gloves	Leather gloves with extra foam are acceptable	SFI / FIA Rated
8	Shoes	Certified Fire resistant Shoes	➢ SFI 3.3 Rated ➢ FIA 8856-2000
9	Socks	Fire Resistant Socks	One Pair

"Interchange of rider safety gear between teams or across different competition categories is strictly prohibited. Any such violation will result in the imposition of severe penalties as determined by the event officials."

Other Mandatory Components:
First Aid Kit, Welding Goggles, Gloves and Fire Extinguishers (2No's)

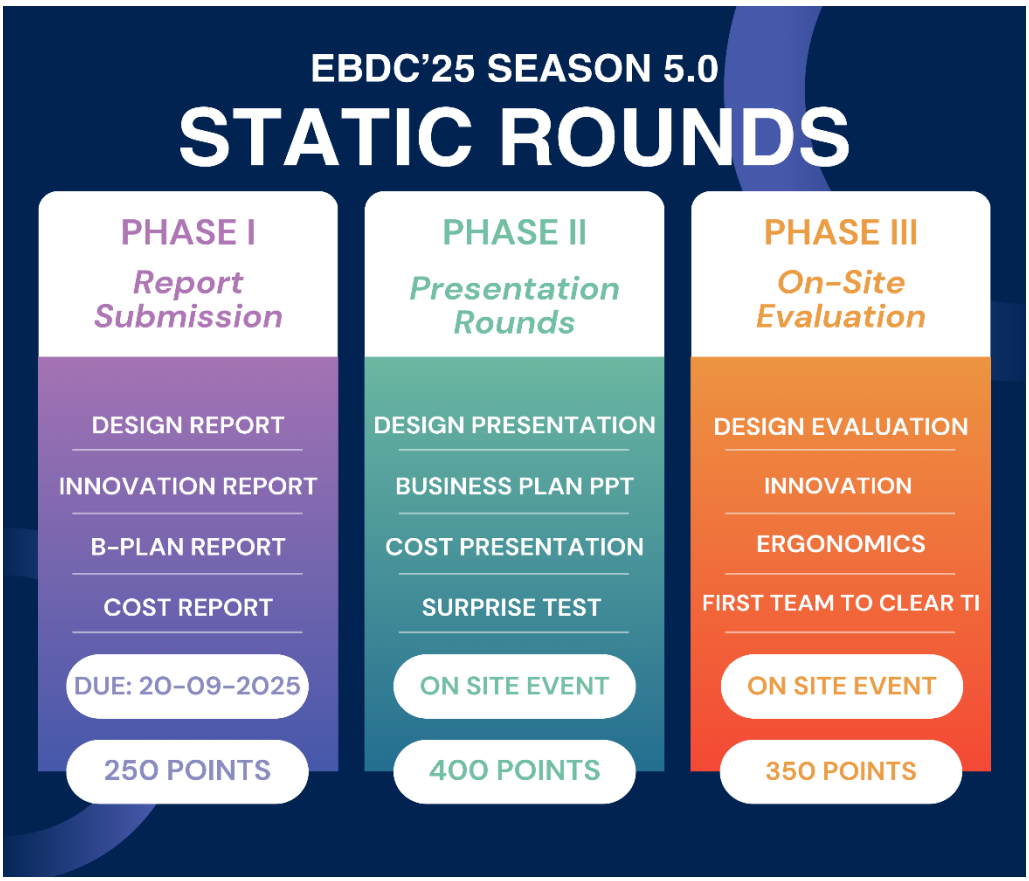
SECTION 8

STATIC ROUNDS

PHASE I - REPORT SUBMISSIONS

Overview

During report submission, all the research and development activities carried out about the vehicle are to be submitted online. All the details should be sent to the official mail id that has been provided. The prime objective is to design, analyze and prepare documentation of the Electric Bike. The design should be complete in all aspects to the extent of being considered ready for manufacturing. The teams will be evaluated based on their knowledge of the basic automotive design, analysis, and documentation about the Electric Bike design requirements. Further details/guidelines about the report submission will be sent to the official mail id of the team. The static rounds will comprise of two phases.



Note:

All the reports should be mailed through only mechatronmotors@gmail.com in PDFformat before the deadline.

The submission of reports should be named as EBDC_TEAM ID_REPORT TYPE (Report Types: DR/IR/BR/CR)

8.1 Design Report (100 Pts.)

The Engineering Design Report is a critical component of the Electric Bike Design Challenge (EBDC), aimed at evaluating the participants' depth of engineering knowledge, innovation, and technical capability. The key objectives of the report are:

- ***Showcase the Design Process:*** To provide detailed documentation of the design journey, highlighting the innovation, creativity, and technical expertise of the team.
- ***Present Technical Specifications:*** To outline critical technical details like dimensions, materials, component selection, and performance metrics, allowing judges to assess the feasibility and effectiveness of the design.
- ***Demonstrate Problem-Solving:*** To explain the challenges encountered during the design and development stages and to describe the innovative solutions implemented to address them.
- ***Evaluate Engineering Skills:*** To assess the team's competency in areas such as computer-aided design (CAD), simulation and analysis, prototyping, testing, and validation.
- ***Assess Practical Considerations:*** To consider the manufacturability, serviceability, and system integration of the electric bike, ensuring that the vehicle is not only technically sound but also practical and functional.
- ***Understand System Integration:*** To evaluate how well different subsystems work together and how the overall vehicle meets its intended design goals.

The team that showcases exemplary application of engineering fundamentals, precise design execution and a deep understanding of their electric vehicle will be awarded the highest recognition in the design event.

Design Report Guidelines

- ✓ The design report must include detailed designs and specifications of all components used in the electric bike, along with the rationale behind selecting each specific component or system.
- ✓ Each team is required to include a master layout of the electric bike in both 2D and 3D formats. All pages of the report must conform to A4 size dimensions.
- ✓ The design report will be verified against the rulebook; therefore, teams must ensure that their design strictly adheres to all rules and guidelines provided.
- ✓ The complete design report, including the table of contents and cover page, must not exceed forty-five (45) pages.
- ✓ A soft copy of the design report must be submitted on or before the specified deadline mentioned in the Event Schedule (Refer to Section 1).
- ✓ The design drafts included in the report must clearly display the basic design views of all major components of the bike.
- ✓ A maximum of 20% deviation from the initial design report is allowed in the final version. If deviations exceed this limit, the team will incur a penalty through point deductions.
- ✓ The report must be submitted in PDF format as a single consolidated file.
- ✓ The naming convention for the file must follow the format: "EBDC_TEAM ID_DR".

- ✓ Failure to submit the report on time will result in a penalty of 10 points per day, for up to 5 days. If the report is not submitted even after 5 days, the team will be disqualified from participating in the final design presentation.
- ✓ Judges have the authority to deduct points if a team fails to adequately explain the engineering concepts, calculations, or construction methods related to their bike.
- ✓ Teams are encouraged to bring supporting materials for the design presentation, such as photographs, technical drawings, plans, charts, or any relevant documentation that helps in conveying their development process effectively.
- ✓ During the design presentation, teams will be evaluated based on the quality of their design and their ability to respond to the questionnaire.
- ✓ The design judges will assess the overall engineering effort by reviewing the team's design report, the responses during the Q&A session, and conducting a visual inspection of the fabricated bike.

The design report should include following contents

8.2 Innovation Report (50 Pts.)

The Innovation Report provides a dedicated platform for participants to highlight the unique and groundbreaking aspects of their electric bike designs. This report allows teams to explain how they have addressed specific engineering challenges or improved key parameters such as performance, safety, energy efficiency, sustainability, or user convenience through innovative approaches. It serves as a vital tool for judges to assess the depth and impact of innovation, considering elements such as creativity, feasibility, and potential contribution to the electric vehicle industry. By presenting a clear and detailed analysis of their innovations, participants can effectively differentiate their projects from competitors and position their designs as forward-thinking solutions that redefine electric mobility standards.

Mechatron Motors strongly advocates for smart technology and continuous innovation in electric mobility. Therefore, all participating teams are strongly encouraged to develop and implement a unique, practical, and original innovation in their electric bikes. The innovation must be novel, easily integrable, and applicable within the electric bike domain, the innovation report should contain all the details of components used for innovation and the reason for selection of that particular component/system.

The report must be submitted in the PDF format as a single file (max 25 pages) and named as "EBDC_TEAM ID_BR". Teams are expected to work upon the following points and prepare both the report and the presentation accordingly;

8.3 Business Plan Report (50 Pts.)

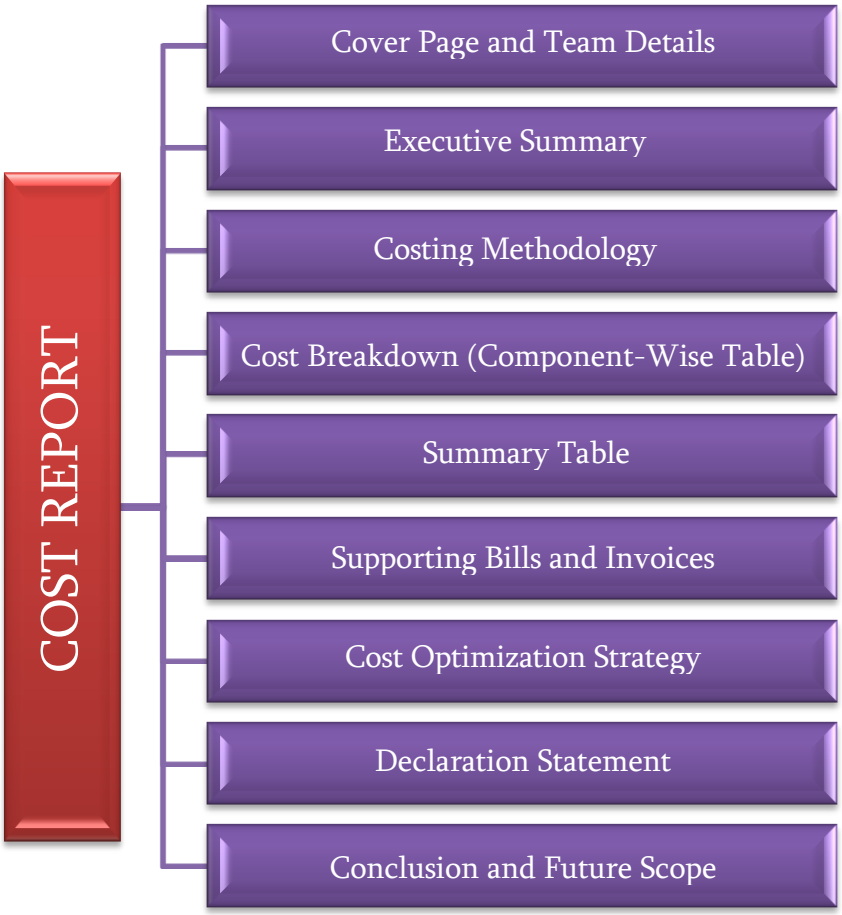
The business plan report serves as a strategic roadmap for participants to articulate the commercial viability and market potential of their electric bike designs, outlining key business objectives, strategies, and financial projections. It provides participants with an opportunity to demonstrate their understanding of market dynamics, customer segments, competitive landscape, and sales channels, supporting informed decision-making in the commercialization of their electric bike designs. The report enables judges to evaluate the feasibility and scalability of participants' business models, considering factors such as revenue streams, pricing strategies, distribution networks, and marketing plans. Participants use the business plan report to justify investment opportunities, attracting potential investors, partners, or sponsors by showcasing the profitability and growth potential of their electric bike designs. By presenting a comprehensive business plan, participants can effectively communicate their vision, goals, and strategies for bringing their electric bike designs to market, contributing to the overall success and sustainability of the Electric Bike Design Challenge.

The report must be submitted in the PDF format as a single file (max 30 pages) and named as "EBDC_TEAM ID_BR". Teams are expected to work upon the following points and prepare both the report and the presentation accordingly;

8.4 Cost Report (50 Pts.)

The Cost Report is a critical component of the Electric Bike Design Challenge (EBDC) and must be prepared with accuracy and transparency. It provides a detailed breakdown of all manufacturing and operational expenses associated with the electric bike. This enables teams to showcase their ability to manage resources effectively and maintain a balance between performance, quality, and cost. Judges will evaluate the report based on cost-effectiveness, material choices, and manufacturing methods. Teams must also explain any innovative features or processes that contribute to significant cost savings.

.The report should include only full retail Indian prices, be truthful, well-documented, and submitted as a single PDF file (max 15 pages) named "EBDC_TEAM ID_CR".



Note:

* All the reports should be submitted on or before due date (Refer section 1)
* Reports should be in pdf format and mailed only to mechatronmotors@gmail.com
* Late submission will lead to penalty of marks
* Presentation Guidelines of all reports will be shared prior to the event dates

SECTION 9

STATIC ROUNDS

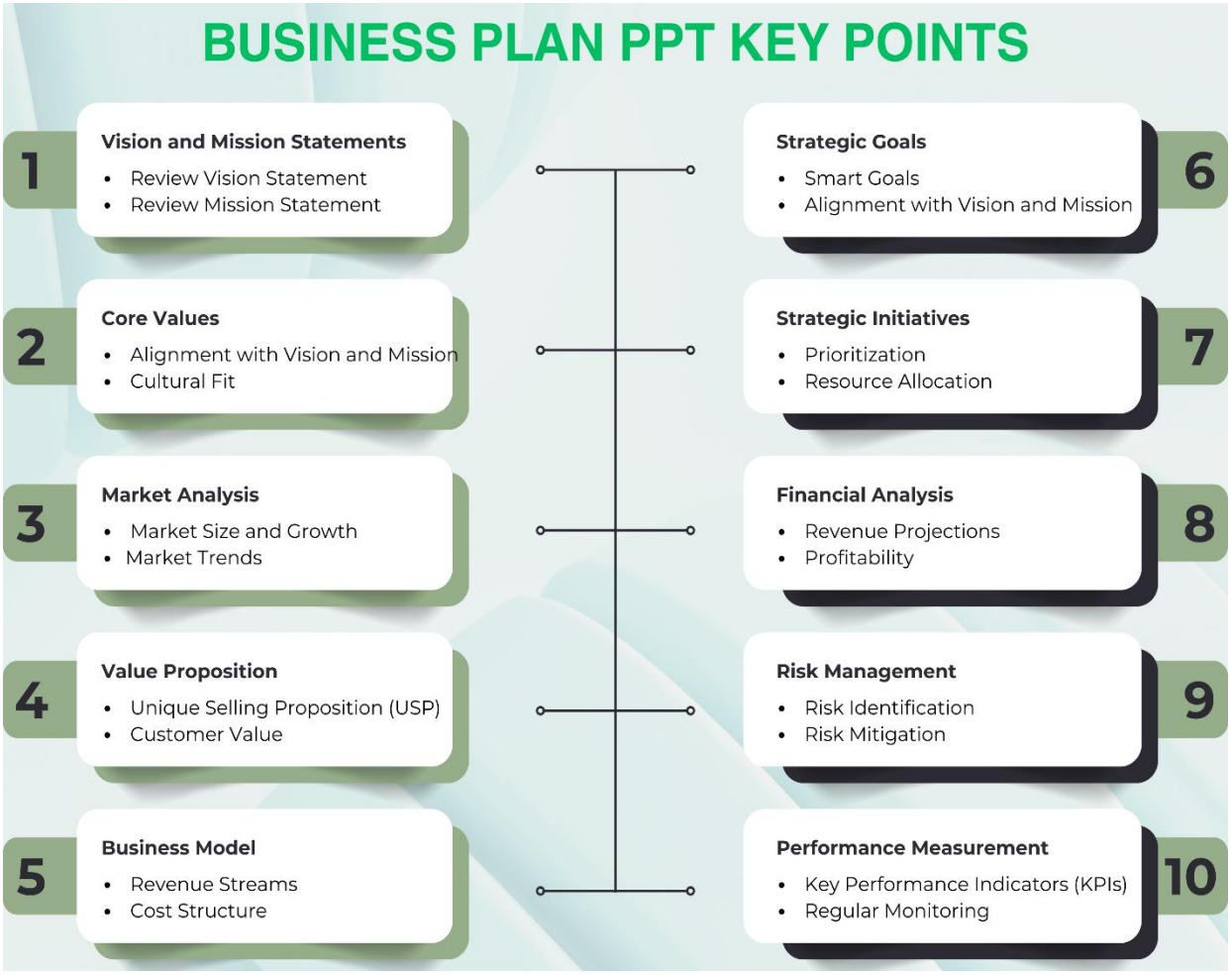
PHASE II - TEAM PRESENTATION

9.1 Design Presentation (100 Pts.)

- ✓ The objective of this design presentation is to evaluate the engineering efforts that went into the design of the E-Bike and how the engineering meets the intent of the market.
- ✓ Students will be judged on the creation of design specifications and the ability to meet those specifications, computer aided drafting, analysis, testing and development, manufacturability, serviceability, system integration and how the vehicle works together as a whole.
- ✓ The vehicle design will be verified with the design report and deviations from the design report should not be allowed until and unless completely justify with documented reasons.
- ✓ Same way, EBDC understands the student's difficulties during the manufacturing process of the E-Bike. For the benefit of the student's deviation up to 20% from the design report is acceptable. Further, it will lead to penalized accordingly.
- ✓ Team should submit the Master layout of the electrical 2-wheeler showing all key dimensions drawing. The decision of judges will be final one.
- ✓ Teams are advised to prepare the design presentation by working out on the following points in the presentation:
    - ❖ Design Goals
    - ❖ Design Philosophy
    - ❖ Objectives
    - ❖ Subsystem Designs
    - ❖ 2D & 3D Layouts
    - ❖ Engineering Analysis
    - ❖ Innovation & Ergonomics
    - ❖ Validation & Results
    - ❖ Conclusion

9.2 Business Plan and Cost Presentation (150 Pts.)

- ✓ The Business Plan and Cost Presentation evaluate the team's understanding of their product's market potential, financial planning, and cost control strategies. It simulates a real-world scenario where participants must pitch their electric bike design as a commercially viable product.
- ✓ Business plan Presentation aim is to provide an opportunity for the engineering students to prepare a strategic business model of establishing a firm which can produce their own design at a certain rate(Example: 10,000 vehicles per year) and market it.
- ✓ For the purpose of the presentation, teams are to assume that the judges are to be a mixed group of corporate executives who may have experience in marketing, production and finance as well as engineering.
- ✓ The business plan must relate to the specific prototype race vehicle entered in the competition. The quality of the actual prototype will not be considered as part of the B-Plan judging.
- ✓ Teams are advised to prepare the business model by working out on the following points (tentative only) in the presentation:



- ✓ Teams are advised to prepare the cost presentation by working out on the following points in the presentation:
    - ❖ Total Cost Summary
    - ❖ Costing Methodology
    - ❖ Major Subsystems Breakdown
    - ❖ Cost Reduction Strategies
    - ❖ Value Engineering
    - ❖ Retail Cost Justification

9.3 Surprise Test (150 Pts.)

- ✓ A Surprise Test carrying a total of 150 points will be conducted at any time during the event days without prior notice.
- ✓ The exact date and time of the test will not be disclosed in advance to ensure fairness and to assess real-time preparedness.
- ✓ The purpose of the test is to evaluate teams on real-time technical preparedness, problem-solving ability, and application of core concepts under pressure.
- ✓ The test will focus on any critical aspects related to vehicle design, safety, technical knowledge, and event-specific domains.
- ✓ Guidelines and instructions for this test will be conveyed only to the team captains during the event.
- ✓ Only the team captain will be authorized to decide whether the team will participate in the test or not. Captain must carefully review the provided guidelines and instructions before participating.
- ✓ *Participation in the Surprise Test is optional but highly recommended.*
- ✓ Teams that choose not to participate in the Surprise Test must formally inform to the organizing committee before the test begins.
- ✓ However, non-participation will result in a deduction of 150 points from the team's total score, which may significantly impact the final ranking.

Note: Teams are encouraged to stay alert and well-prepared throughout the event to maximize their scoring potential. The Surprise Test is a golden opportunity to demonstrate excellence beyond scheduled evaluations.

9.4 Presentation Scoring Criteria

Each static round is evaluated by a panel of judges based on the following core criteria. These criteria will be applicable to Design Presentation, Business Plan and Cost Presentation & Surprise Test

Content of Presentation

- ✓ *Accuracy, depth, innovation, and relevance of technical/business content.*

Presentation Quality

- ✓ *Structure, logical flow, clarity, and adherence to time limits.*

Content Delivery

- ✓ *Communication skills, confidence, engagement, and teamwork.*

Effectiveness of Visual Aids

- ✓ *Use of diagrams, animations, charts, and how effectively they support the content.*

Team's Response to Judge's Questions

- ✓ *Technical knowledge, problem-solving ability, team coordination during Q&A.*
- ✓ *Depth of understanding, clarity in answers, and coordination among team members*

Scoring Method

- ✓ *No of judges will be vary for each static presentation rounds* (typically 2 to 5).
- ✓ *Each judge will award marks based on the event's maximum score*
- ✓ *The final team score is the average of all judge scores.*

For example: Scoring Table (Design Presentation Rounds - 100 Points)

Team Name	*Judge 1 (100)*	*Judge 2 (100)*	*Judge 3 (100)*	*Judge 4 (100)*	*Total (400)*	*Team Score (100) (Average of 4)*
XXXX	*50*	*60*	*70*	*80*	*260*	*65*

For example: Scoring Table (B-Plan & Cost Presentation Rounds - 150 Points)

Team Name	*Judge 1 (150)*	*Judge 2 (150)*	*Judge 3 (150)*	*Total (450)*	*Team Score (150) (Average of 3)*
XXXX	*120*	*130*	*140*	*180*	*130*

SECTION 10

STATIC ROUNDS

PHASE III – ON-SITE EVALUATION

10.1 On-Site Design Evaluation (100 Pts.)

Overview:

The On-Site Design Evaluation is a critical component of EBDC 5.0 in which evaluation focuses on assessing the practical design, safety, and innovation aspects of the teams' vehicles through direct inspection and interactive questioning.

Guidelines:

- ✓ The evaluation will be conducted on-site during the event at a designated area.
- ✓ Teams are advised to manufacture the vehicle with pre-planned strategies so that the vehicle would be able to compete in several tasks and tests.
- ✓ Evaluation will be performed exclusively by industry experts with relevant field experience to ensure practical and industry-relevant scrutiny.
- ✓ Academic personnel will not be part of this evaluation panel, to maintain a real-world focus.
- ✓ Teams must present and justify every aspect of their vehicle design in detail.
- ✓ Teams must clearly demonstrate and justify the safety features incorporated in their design.
- ✓ Evaluators will assess both the design quality and safety robustness based on the evaluation parameters that will be disclosed during the event time.
- ✓ The evaluation will include a Q&A session, where teams must answer technical and safety-related queries confidently.
- ✓ Teams unable to justify their design or safety features satisfactorily may receive deductions in their scores.

Evaluation Parameters and Justifications:

To be disclosed during the event.

Additional Notes:

- ✓ Teams should prepare all necessary design documents, CAD drawings, and safety test reports to support their evaluation.
- ✓ Evaluation will be interactive and transparent, allowing teams to clarify doubts and demonstrate their design knowledge.
- ✓ The outcome of this evaluation heavily influences the team's overall ranking and is critical for qualifying in subsequent event stages.

10.2 Innovation Evaluation (150 Pts.)

Overview:

The Innovation Evaluation in EBDC 5.0 aims to assess the practical, impactful, and safe innovative features integrated into the competing vehicles. Mechatron Motors strongly advocates for smart technology and continuous innovation in electric mobility. Therefore, all participating teams are strongly encouraged to develop and implement a unique, practical, and original innovation in their electric bikes. The innovation must be novel, easily integrable, and applicable within the electric bike domain.

Guidelines:

- ✓ Evaluation will be conducted on-site during the event by a panel of industry experts only.
- ✓ Academic personnel will not participate in the innovation evaluation to maintain an industry-driven assessment.
- ✓ Only innovations physically installed and operational on the vehicle will be considered.
- ✓ Prototype models, conceptual ideas, or innovations not integrated into the actual vehicle will be rejected and result in penalties.
- ✓ Teams must justify the design and demonstrate the safety and functionality of the innovation under event conditions.
- ✓ Innovations will be judged on real-world applicability, safety, originality, and contribution to vehicle performance or efficiency.
- ✓ A thorough Q&A session will be conducted where teams must confidently explain their innovation's working, benefits, and safety.
- ✓ *For electrical innovations, the power supply must be taken from the battery Pack only.*

Evaluation Parameters and Justifications:

To be disclosed during the event.

Additional Notes:

- ✓ Innovations not physically integrated into the vehicle will lead to penalties, including point deductions or disqualification from this evaluation segment.
- ✓ Teams are advised to carry all necessary supporting materials (design documents, test results, videos) for better presentation.
- ✓ This evaluation encourages practical, safety-conscious innovations that push the boundaries of vehicle technology within event regulations.

10.3 Ergonomics & Aesthetics Evaluation (50 Pts.)

Guidelines:

- ✓ Evaluation will be conducted only on-site during the event by industry experts to ensure practical relevance. Academic evaluators will not be part of this assessment.
- ✓ Teams must justify and explain their ergonomic design choices and aesthetic concepts clearly during the evaluation.
- ✓ The focus is on user comfort, ease of vehicle control, safety in human-machine interaction, and visual appeal that enhances marketability.
- ✓ Teams should prepare to demonstrate how their design improves rider experience and safety.
- ✓ Presentation clarity and confidence in justifying design choices can significantly influence scoring.

Evaluation Parameters and Justifications:

S.No	Parameter	Description & Justification	Marks (Out of 50)
1	*Ergonomic Design*	*Comfort, ease of access and operation, rider posture, control placement, and safety considerations for the user.*	*25*
2	*Aesthetic Appeal*	*Visual design, finish, and styling that enhance the overall attractiveness and brand image of the vehicle.*	*15*
3	*Presentation & Justification*	*Ability to clearly explain to the judges about the rationale behind ergonomic and aesthetic decisions.*	*10*

10.4 First Team to Clear TI Round (50 Pts.)

Guidelines:

- ✓ Each team is allowed a maximum of three attempts to clear the TI round.
- ✓ TI round assesses compliance with safety, technical & regulatory standards as per the event rulebook.
- ✓ The inspection will be conducted by the Technical Inspection Committee appointed by the organizers.
- ✓ Teams are encouraged to prepare thoroughly as per rulebook to minimize the number of attempts.
- ✓ The first team to clear the TI round without any major issues or rechecks, within their three attempts, will be awarded 50 points.
- ✓ Points will be awarded only once, to the earliest team cleared successfully.
- ✓ Teams failing to clear within three attempts must rectify issues before further participation.

SECTION 11

DYNAMIC ROUNDS

(All rounds applicable to both Alpha and Beta Category Teams)

11.1 Qualifying Procedure: Technical Inspection (TI)

Participation in dynamic events is strictly limited to teams who are all successfully clear the Technical Inspection (TI) rounds. This is to ensure that all vehicles are safe, functional, and regulation-compliant before they are allowed to participate in any track activity.

General Guidelines for Technical Inspection:

- ✓ TI is a Qualifying Round for all teams. TI sheet will be disclosed during the event time only.
- ✓ Each team is allowed up to three (3) attempts to pass Technical Inspection.
- ✓ Failure to pass the TI within the allotted attempts will result in either disqualification from the dynamic events or the imposition of a major penalty, subject to the judges' decision.
- ✓ Only the following team members will be allowed inside the TI Arena:
  - ➢ *Team Captain / Vice Captain*
  - ➢ *Technical Team members (Max 3)*
  - ➢ *Designated Driver / Co-Driver*

Structure of the Technical Inspection (TI)

TI is divided into **three (3) mandatory level inspection modules**, all of which must be cleared to qualify. Only after successfully completing all three inspections, the vehicle will be issued a "TI Clearance Sticker."

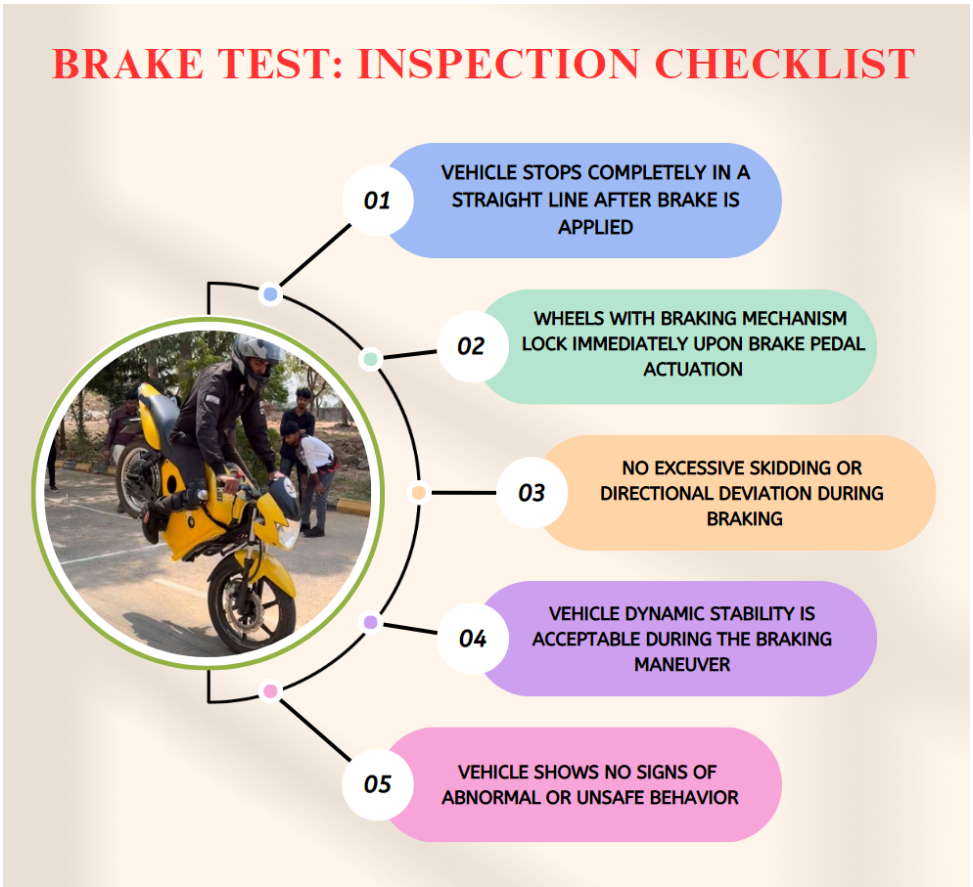
Modification Guidelines:

- ✓ Once a vehicle has successfully passed Technical Inspection, the approved configuration must remain unchanged throughout the event. Any violation of this rule may result in penalties or disqualification.
- ✓ No Modifications Allowed after TI clearance.
- ✓ Non-identical or unapproved replacement parts may incur performance penalties.
- ✓ Repairs using different parts must receive prior approval from judges or event organizers.
- ✓ Minor adjustments and routine maintenance (as allowed by the rulebook) are permitted and not considered modifications.

NOTE: Driving the E-Bike outside the designated event premises is strictly prohibited. Any Teams found driving their vehicle at any off-site location may face disqualification from the event.

11.2 Brake Test

- ✓ The Brake Test is mandatory, though it does not carry any points.
- ✓ Passing the Brake Test is required to qualify for all subsequent dynamic events.
- ✓ Each team is allowed a maximum of two (2) attempts to clear the Brake Test.
- ✓ If a vehicle is found to be dynamically unstable or unsafe, Teams will be given an opportunity to rectify issues with imposition of a minor penalty, subject to the judges' decision.



11.3 Drag Race Test (100 Pts.)

- ✓ After the successful completion of brake test, vehicle will be allowed for the drag race test.
- ✓ The Drag Race Challenge tests the straight-line acceleration and launch performance of the electric two-wheeler.
- ✓ It evaluates the vehicle's ability to achieve maximum speed over a short distance (50-75m) in the minimum possible time. Each team is allowed only one attempt.
- ✓ While the event typically involves vehicle pairing runs, the lineup of two vehicles for a side-by-side drag race will be subjected to the judges. Such decisions may be based on track conditions, safety considerations or event flow.
- ✓ All decisions regarding vehicle pairing, sequencing, and run format will be made by the event judges or organizing committee that are final and binding.
- ✓ *Timings will be checked out using electronic system or stop watches for all dynamic rounds.*

$$\textbf{Drag Race Score} = 100 \times (T_{longest} - T_{yours}) / (T_{longest} - T_{shortest})$$

Where:

$T_{shortest}$ = *Fastest time by any vehicle*

T_{yours} = *Time for the vehicle to be scored*

$T_{longest}$ = *Slowest time by any vehicle*

NOTE: Rules can be changed at any time of the event based on the situation (Distance for acceleration or braking) might be changed if required.

11.4 Maneuverability Test (100 Pts.)

The following criteria must be clearly focused on by the team during the Maneuverability Test: Completion Time, Obstacle Navigation Accuracy, Bike Balance & Stability, Throttle & Braking Smoothness, and Rider Skill (Posture and Confidence)

- ✓ The Maneuverability Test aims to assess the agility, control, responsiveness, and handling performance of electric bikes through a tight and technically demanding track.
- ✓ This event simulates real-world riding agility challenges, including quick directional changes, high-speed maneuvers, precise braking, and acceleration in tight spaces.
- ✓ This is a spectator-friendly event designed to highlight both vehicle engineering and rider skill.
- ✓ The track layout often includes sections that Rapid acceleration zones, tight cornering and chicanes, Cone-defined slaloms (auto cross cones), figure-8 loops, offset gates, and narrow paths, U-turn box.
- ✓ Exact track layout will be revealed at the event time only. Each team is allowed only one attempt.

"The following track layout image is from the previous EBDC 4.0 season and it is provided only for reference purposes for new teams"

$$\textbf{Maneuverability Score} = 100 \times (T_{longest} - T_{yours}) / (T_{longest} - T_{shortest})$$

Where:

T_S = *smallest time taken by any vehicle*

T_Y = *time for the vehicle to be scored*

T_L = *maximum time taken by any vehicle*

*****The penalty criteria in the Maneuverability round will be revealed during the event time.***

Rules can be changed at any time of the event based on the situation.

11.5 Off Road Test (100 Pts.)

The following criteria must be clearly focused on by the team during the Off Road Test:

Terrain Traversal & Obstacle Clearance, Suspension Response & Shock Absorption, Bike Stability & Traction Management, Rider Skill & Control and Completion Time.

- ✓ The Off-Road Test is designed to assess the durability, terrain adaptability, suspension effectiveness, and rider skill of electric bikes in rugged and unpredictable environments.
- ✓ Evaluates the e-bike's performance under harsh conditions including gravel, mud, rocks, steep inclines and declines, Logs, ramps, root-like obstacles, uneven surfaces, water patches and technical obstacles.
- ✓ Additional obstacles could be there subject to final track preparation at the event.
- ✓ Requires the rider to demonstrate advanced off-road riding skills, such as line selection, momentum control, and terrain reading.
- ✓ Exact track layout will be revealed at the event time only. Each team is allowed only one attempt.

New teams may refer to the previous EBDC 4.0 season track layout as a guide for understanding the course design

$$\textbf{Off Road Score} = 100 \times (T_{longest} - T_{yours}) / (T_{longest} - T_{shortest})$$

Where:

T_S = smallest time taken by any vehicle

T_Y = time for the vehicle to be scored

T_L = maximum time taken by any vehicle

******Penalty criteria for the off road test will be disclosed at the time of the event.***

Judges reserve the right to modify rules at any point based on event flow.

11.6 Hill Climb Test (100 Pts.)

The following criteria must be clearly focused on by the team during the Hill Climb Test: Climb Completion Time, Motor Efficiency & Torque Delivery, Vehicle Stability & Traction, Rider Control and Posture, Design Effectiveness in Real Terrain

- ✓ The Hill Climb Test is designed to evaluate an e-bike's powertrain performance, gradient handling ability, and motor efficiency when ascending a steep incline.
- ✓ This test simulates real-world scenarios such as hilly roads and steep terrain.
- ✓ Tests how well the e-bike maintains traction and stability on a 40° incline.
- ✓ Validates the design considerations made during the vehicle development phase.
- ✓ Evaluates rider and motor coordination under high-load conditions, including the performance of throttle-assisted systems.
- ✓ Exact track layout will be revealed at the event time only. Each team is allowed only one attempt.

New teams may refer to the previous EBDC 4.0 season track layout as a guide for understanding the course design

$$\textbf{Hill Climb Score} = 100 \times (T_{longest} - T_{yours}) / (T_{longest} - T_{shortest})$$

Where:

T_S = smallest time taken by any vehicle

T_Y = time for the vehicle to be scored

T_L = maximum time taken by any vehicle

******Penalty criteria for the Hill Climb test will be disclosed at the time of the event.***

Judges reserve the right to modify rules at any point based on event flow.

11.7 Bump Test (100 Pts.)

The following criteria must be clearly focused on by the team during the Bump Test:
Suspension Performance, Rider Stability & Posture, Vehicle Control & Tracking,
Structural Soundness (No Failures), Smoothness of Ride

- ✓ To evaluate the suspension system, structural integrity, and rider comfort of the electric bike when subjected to repeated impacts and irregularities similar to real-world road bumps and potholes.
- ✓ The vehicle will traverse a short track featuring a series of artificial bumps of varying height and spacing.
- ✓ The test simulates rough road conditions and assesses the bike's ability to absorb shocks without compromising control or safety.
- ✓ Riders must maintain control, posture, and speed while the vehicle undergoes vertical and horizontal disturbances.
- ✓ No part of the bike should get detached or hit the ground. Rider must not place feet on the ground.
- ✓ Exact track layout will be revealed at the event time only. Each team is allowed only one attempt.

New teams may refer to the previous EBDC 4.0 season track layout as a guide for understanding the course design

$$\textbf{Bump Test Score} = 100 \times (T_{longest} - T_{yours}) / (T_{longest} - T_{shortest})$$

Where:

T_S = smallest time taken by any vehicle
T_Y = time for the vehicle to be scored
T_L = maximum time taken by any vehicle

******Penalty criteria for the bump road test will be disclosed at the time of the event.***

Judges reserve the right to modify rules at any point based on event flow.

11.8 Female Endurance Test (100 Pts.)

- ✓ The Girls Endurance Round aims to encourage female participation in core automotive engineering and motorsports by testing the endurance, reliability, and efficiency of the vehicle.
- ✓ The Female Endurance Test is mandatory for all teams participating in EBDC 5.0.
- ✓ Since the 100 points are part of the overall scoring system, non-participation will result in an automatic deduction of 100 points from the team's total score.
- ✓ Teams without a female rider or those who withdraw from the Female Endurance Test will receive no exemption. The organizing committee is not responsible for any team's non-compliance.
- ✓ *This round is based on minimum time taken to complete 5 laps that rewards the fastest team with maximum points and scales the others proportionally.*
- ✓ Exact track layout will be revealed at the event time only. Each team is allowed only one attempt.

New teams may refer to the previous EBDC 4.0 season track layout as a guide for understanding the course design

Scoring Formula:

Points Scored =

(Team's Time / Best Time)×100

Where:

✓ *Best Time = the lowest time recorded among all teams to complete 5 laps.*

✓ *Team's Time = the time taken by the specific team being scored.*

For Example:

✓ Team A completes 5 laps in 300 seconds (fastest).

✓ Team B completes in 360 seconds.

Then for Team B:

Points Scored = (300/360) × 100

= 83.33 points

11.9 Three Speed Mode Test (100 Pts.) / Skip Pad Test (100 Pts.)

For ALPHA Teams: Skip Pad Test	For BETA Teams: Three Speed Mode Test
To assess the bike's cornering grip, lateral stability, and turning consistency under continuous circular motion.	To evaluate the performance, responsiveness, and reliability of the electric bike under different speed modes configured by the team (Example: Eco, Normal, Sport).
The rider must ride in tight circular loops (either figure-8 or continuous circle) within a marked pad.	Each mode should show clear differentiation in speed, acceleration, and control.
The bike's handling, grip, lean angle, and control under lateral forces are tested.	Testing may be conducted either on newly designed tracks or existing dynamic event sections, depending on event flow
Typically conducted on wet or smooth surfaces to challenge traction.	All three modes must be demonstrated within a single attempt.
Placing a foot down or cone touch or skidding out results in point deduction.	Failure to show mode difference may lead to point deductions or disqualification.
******Penalty criteria for both the test will be disclosed at the time of the event.*** ***Judges reserve the right to modify rules at any point based on event flow.*** ***Exact track layout will be revealed at the event time only. Each team is allowed only one attempt.***	

11.10 Surprise Test (100 Pts.)

- ✓ The Surprise Test is a strategically designed evaluation in the dynamic events of EBDC 5.0, aiming to assess how well teams and their electric bikes respond to real-time, unpredictable challenges.
- ✓ These tests are crafted to simulate unexpected real-world scenarios, placing emphasis on the rider's skill, the bike's versatility, and the team's preparedness under pressure.
- ✓ This round introduces a dynamic twist to the competition—requiring participants to think fast, act smart, and operate efficiently with minimal preparation time.
- ✓ Each challenge is unique and unrevealed until the moment of execution, adding an exciting, competitive edge to the event.
- ✓ Encourages teams to train comprehensively, not just for known tests but for overall dynamic competence.
- ✓ Promotes technical flexibility and multi-skill readiness within the team, especially for unexpected track or operational scenarios.

11.11 Endurance Test (200 Pts.)

The following criteria must be clearly focused on by the team during the Endurance Test:

Continuous Operation, Battery Efficiency, Rider Consistency, Lap Consistency, Structural Durability, Motor temperature control, Completion without breakdowns & Total distance covered

- ✓ The Endurance Rounds are aimed at evaluating the real-world performance, reliability, and consistency of the e-bike over an extended duration or distance.
- ✓ It tests both mechanical durability and energy management strategy of the vehicle, as well as the physical endurance and control of the rider.
- ✓ To assess the bike's overall efficiency, battery durability, thermal stability, and rider stamina over an extended track duration (60–90 minutes of continuous run).
- ✓ The primary evaluation metric for this round will be the total distance covered within the stipulated time frame.
- ✓ The vehicle that successfully travels the maximum distance within the allotted time will be declared the winner of the Endurance Round.
- ✓ All teams must ensure that their vehicle completes as many laps as possible without mechanical failure or battery depletion. In the event of a tie in distance, the tie-breaker will be determined based on the remaining battery percentage and vehicle health assessment conducted immediately after the round.
- ✓ This format simulates real-world scenarios where range and reliability are key to e-bike performance, encouraging teams to focus on both energy management and mechanical robustness during design and testing phases.

The track provided will be 4.5kms and the teams have to run their vehicle for given condition during event time.

New teams may refer to the previous EBDC 4.0 season track layout as a guide for understanding the course design

Rules of Endurance:

- ✓ The vehicle will not be allowed into the Pit arena once it entered the race track.
- ✓ Changing of batteries or charging of batteries after entering into endurance is strictly restricted.
- ✓ If a vehicle hits other's vehicle then the team that hit the E-Bike will be disqualified.
- ✓ Overcrossing in the no-overcrossing zones lead to penalty.
- ✓ If any vehicle stops on the track they can take their E-Bike to a side of track and can repair there only under the observation of a volunteer.

Endurance Test Penalties:

- ➢ *Mechanical breakdown: If a vehicle stops due to any mechanical damage, that may be of non- functioning of brakes, slippage of chain over sprocket, tyre puncture, Changes in wheel alignment etc., then these mechanical damages will be considered as Mechanical breakdown.*
  - ✓ A 50 points penalty will be added to durability test round if the team manages to rectify the mechanical breakdown within 10 Minutes of given time.
  - ✓ Any team that is unable to rectify mechanical breakdown for 10 minutes will be eliminated from the Round, such case would be called as MECHANICAL FAILURE
  - ✓ Their vehicle will be pulled away from the track if track marshal announce for mechanical Failure
  - ✓ Total laps covered till that time will be counted.
- ➢ *Electrical breakdown: If vehicle halts suddenly due to non-functioning of the electrical system such as Fusing problem, Motor over heating due to excessive load, Over heating of accumulator, wire burnout, Motor controller issues etc., then such condition will be called as electrical breakdown.*
  - ✓ A 50 points penalty will be added to endurance round if the team manages to rectify electrical breakdown within 5 Minutes of given time.
  - ✓ Team unable to rectify the electrical breakdown for 5 minutes will be eliminated from Endurance Round, such case would be called as ELECTRICAL FAILURE.
  - ✓ Their vehicle will be pulled away from the track if track marshal announce for Electrical Failure.
  - ✓ Total laps covered till that time will be counted.
- ➢ *Over-taking:* Track marshal will guide the team drivers of overtaking and non-overtaking zones during formation lap. A 50 points penalty will be awarded to the team if their vehicle over takes other vehicle in non-overtaking zone.
- ➢ *Cone touch:* Cones will be place at the border of the track. If any vehicle touches a cone will face a penalty of 20 points.
- ➢ *Cone Down:* If vehicle hits the cone then 20 point penalty per cone down will be added.
- ➢ *Tyre out of track:* If any tyre found to be out of track then teams have to face a penalty of 30 Points.
- ➢ *Vehicle out of track:* If the whole vehicle is out of track, then the penalty of 50points is imposed.

- *Rash or Aggressive Driving:*

Any rash or aggressive driving behavior (such as forcing another bike off the track, refusal to allow passing or close driving that would cause the likelihood of bike contact) will result in a 20 points penalty.

- *Inexperienced Driver:*

The EBDC organizing team may disqualify a driver if the driver is too slow, too aggressive or driving ina manner that in the sole opinion of the event.

NOTE: Rules can be changed at any time of the event based on the situation (Distance and Time for endurance) might be changed if required.

11.12 Dr. Radhakrishnan Award for Best Faculty

- Presented to the faculty mentor who has demonstrated exceptional dedication, leadership, and technical guidance throughout the EBDC 5.0 journey. This award honors academic excellence, mentorship, and a commitment to student innovation in line with the visionary spirit of Dr. Sarvepalli Radhakrishnan.

11.12 Team Member Safety Jackets

- ✓ *Wearing a safety jacket is mandatory for all the teams during the event.*
- ✓ Each team must have a minimum of four technical team members equipped with color-coded industrial safety jackets:
  - *ALPHA Teams – Orange Colour (For 1KW Category)*
  - *BETA Teams – Green Colour (For 2KW Category)*
- ✓ Jackets must display the team name and vehicle number on both the front and back in black lettering at least 1 inch tall.
- ✓ These jackets will be inspected during Technical Inspection (TI).
- ✓ Teams without compliant jackets will not be permitted to proceed with TI or enter the event area.
- ✓ During dynamic events, four designated crew members must stay near the vehicle, including one with a fire extinguisher.
- ✓ Only these designated and properly uniformed team members are allowed to approach the track or the vehicle during active events, and only when called upon by event officials.

SECTION 12

SCORE POINTS - STATIC ROUNDS

S.NO	DESCRIPTION	DATE	POINTS
1	Design Report	10th September 2025	100
2	Innovation Report		50
3	Business Plan Report	20th September 2025	50
4	Cost Report		50
5	Design Presentation	23rd & 24th September 2025	100
6	Innovation Evaluation		150
7	Business Plan Presentation	23rd & 24th September 2025	150
8	Cost Presentation		
9	On-Site Design Evaluation	24th September 2025	100
10	Ergonomics & Aesthetics		50
11	First Team to Clear TI	23rd & 24th September 2025	50
12	Surprise Test (Optional)		150
		Total Points	**1000**

SECTION 13

SCORE POINTS - DYNAMIC ROUNDS

S.NO	DESCRIPTION	DATE	POINTS
1	Brake Test	25th September 2025	Qualifying Round
2	Drag Race Test	25th September 2025	100
3	Maneuverability Test	25th September 2025	100
4	Off Road Test	25th September 2025	100
5	Hill Climb Test	25th September 2025	100
6	Bump Test	25th September 2025	100
7	Female Endurance	25th September 2025	100
8	Three Speed Mode Test (2 Kw)	25th September 2025	100
	Skip Pad Test (1 Kw)		
9	Surprise Test (Optional)	26th September 2025	100
10	Endurance Test	26th September 2025	200
		Total Points	**1000**

****The organizing committee reserves the sole right to modify, reschedule, or cancel any of the above-mentioned dynamic rounds at any time due to time constraints or unforeseen circumstances.*

A National Level Electric Bike Design Challenge (EBDC'25)	STATIC ROUNDS	DYNAMICS ROUNDS	TOTAL POINTS
	1000	1000	2000

**Based on the total marks obtained from the team, winners and runners will be announced*

SECTION 14

AWARD CATEGORIES

S.No.	Award Categories	Prize Money (2 KW)	Prize Money (1 KW)
1.	Overall Champions	INR 50,000 + Trophy	INR 40,000 + Trophy
2.	Overall Runner Up	INR 25,000 + Trophy	INR 20,000 + Trophy
3.	Second Runner Up	INR 10,000 + Trophy	INR 10,000 + Trophy
4.	Best Engineering Design	INR 5,000 + Trophy	INR 3,000 + Trophy
5.	Best Innovation	INR 5,000 + Trophy	INR 3,000 + Trophy
6.	Best B-Plan & Cost Presentation	INR 5,000 + Trophy	INR 3,000 + Trophy
7.	Drag Race Winner	INR 5,000 + Trophy	INR 3,000 + Trophy
8.	Runner Up Drag Race	Trophy	Trophy
9.	Best Maneuverability Test	INR 5,000 + Trophy	INR 3,000 + Trophy
10.	Runner Up Maneuverability Test	Trophy	Trophy
11.	Best Off-Road Test	INR 5,000 + Trophy	INR 3,000 + Trophy
12.	Runner Up Off-Road Test	Trophy	Trophy
13.	Best Hill Climb Test	INR 5,000 + Trophy	INR 3,000 + Trophy

14.	Runner Up Hill Climb Test	Trophy	Trophy
15.	Best Bump Test	INR 5,000 + Trophy	INR 3,000 + Trophy
16.	Runner-up Bump Test	Trophy	Trophy
17.	Female Endurance Winner	INR 5,000 + Trophy	INR 3,000 + Trophy
18.	Runner-up Female Endurance	Trophy	Trophy
19.	Best Three Speed Mode Test & Skip Pad Test	INR 5,000 + Trophy	INR 3,000 + Trophy
20.	Runner-up 3 Speed Mode Test & Skip Pad Test	Trophy	Trophy
21.	Best Endurance	INR 5,000 + Trophy	INR 3,000 + Trophy
22.	Runner-Up Endurance	Trophy	Trophy
23.	Surprise Event Winner (Both Static and Dynamic)	Trophy	Trophy
24.	Dr. Radhakrishnan Award (Best Faculty Advisor)	INR 5,000 + Trophy	INR 5,000 + Trophy
25	Best Driver (Men)	Trophy	Trophy
26	Best Captain (Men)	Trophy	Trophy
27	Best Driver (Women)	Trophy	Trophy
28	Best Captain (Women)	Trophy	Trophy

29	Best Team Spirit Award	Trophy	Trophy
30	Best Team Presentation Award	Trophy	Trophy
31	Best Retrofitted Design Award	Trophy	Trophy
32	Best Build Quality Award	Trophy	Trophy
33	Best Ergonomics and Aesthetics	Trophy	Trophy
34	Best Commercial Bike	Trophy	Trophy
35	Best Team Excellence	Trophy	Trophy
36	Best Women Participant Award	Trophy	Trophy
37	Fair Play Award	Trophy	Trophy
38	Light Weight Award	Trophy	Trophy
39	Selfie Contest	Trophy	Trophy
40	People Choice Award	Trophy	Trophy
	Total	**INR 1,45,000 + Trophies**	**INR 1,08,000 + Trophies**

****The entire cash prize will be distributed to the respective winning teams on the same day during the award ceremony.*

SECTION 15

ORGANIZING COMMITTEE

1. Chief Patron – Shri. R.Sundar, Managing Trustee, SNR Trust
2. Patron – Shri. S. Narendran, Joint Managing Trustee, SNR Trust
3. Co-Patron – Dr. J. David Rathnaraj, Principal, SRIT
4. Convener – Dr.B.Chokkalingam, HOD/MECH, SRIT
5. Co-Convener – Mr.S.Veerakumar, Assistant Professor (Sr.Gr) / MECH, SRIT
6. Event Coordinators – Mr.B.Varun, AP (Sl.Gr)/ MECH

   Dr.R.Tamilselvan, AP (Sr.Gr)/ MECH

   Mr.E.Ramkumar, AP (Sl.Gr/EEE
7. Student Coordinators – Ashwanth (IV - MECH)

   Lakshayraj (IV – MECH)

   Joshna (IV – CSE)

   Kaviya (IV – CSE)

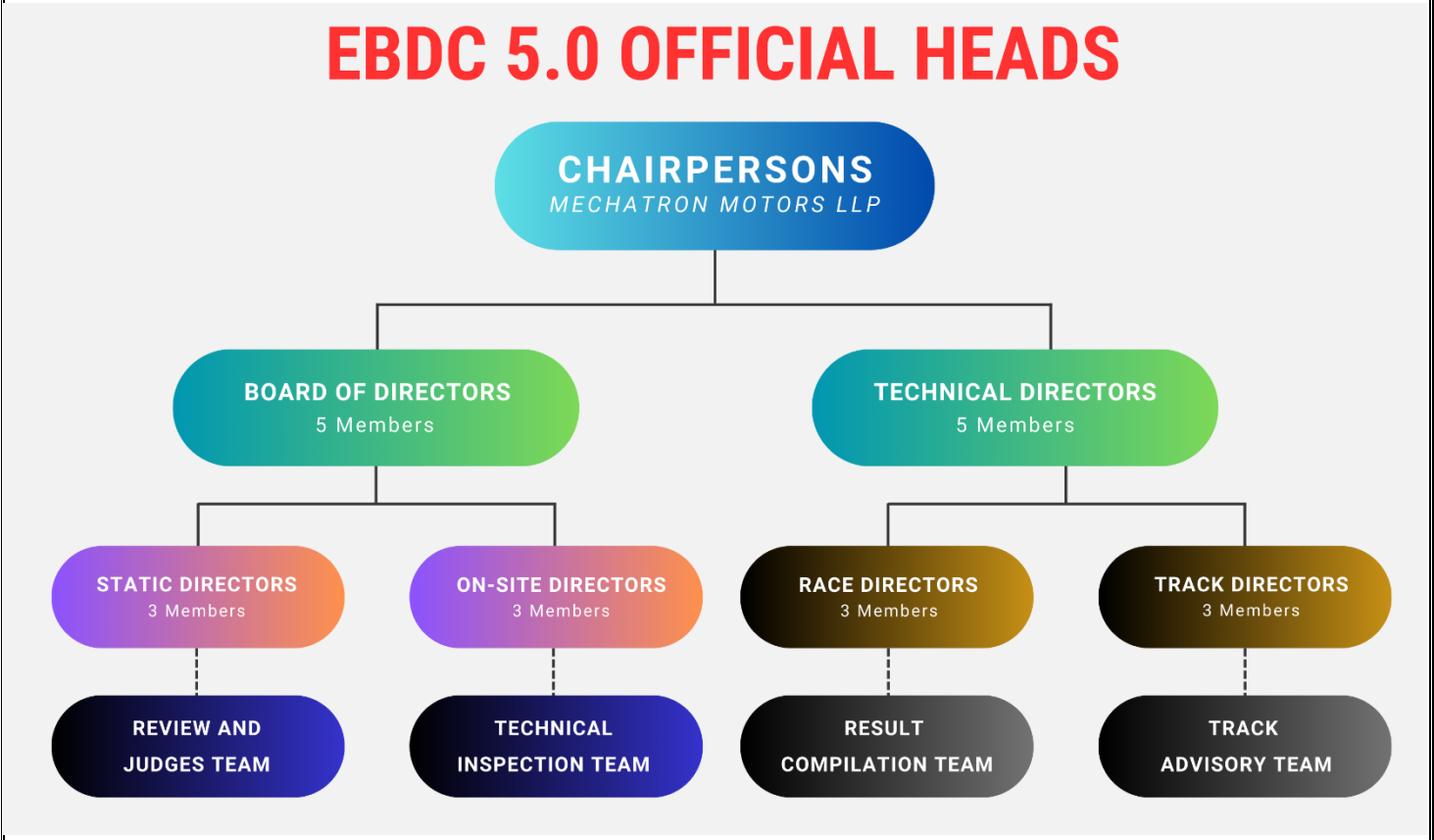
   Sudharsahan (III – MECH)

   Pranavan (II – MECH)

   Pranav (II – MECH)

SECTION 16

EBDC OFFICIAL HEAD'S



The EBDC Official Heads will be formally announced one month prior to the event. These officials will comprise industry experts and professionals, who bring real-world insight and experience to the competition.

During the event, they will: Directly interact with teams, Ask technical and performance-based questions, and independently evaluate vehicle design and functionality across both static and dynamic rounds.

Please note:

- ✓ In addition to the items listed in the TI Sheet or Rulebook, industry experts or TI inspectors may provide further observations during the event.
- ✓ Teams may be asked to make modifications or corrections to their vehicles on-site to align with industry standards and safety regulations.
- ✓ All teams are required to follow the instructions provided by the TI panel or inspectors, and any changes must be implemented as directed.

*****Failure to comply with TI inspectors may result in disqualification or major penalty.**

******Their decisions and assessments will play a critical role in the overall team scoring and validation process.***

SECTION 17

CONTACT DETAILS

Please feel free to contact us in case of any queries.

Faculty Coordinator

Mr.S.Veerakumar: +91-9688472728

Assistant Professor (Sr.Gr)

Department of Mechanical Engineering

Student Coordinators

Mr. Ashwanth: +91-8610043511

Mr. Pranavan: +91-8903706745

Ms. Joshna: +91-9629074069

Address

E-Vehicle Laboratory,
Department of Mechanical Engineering,
Sri Ramakrishna Institute of Technology,
Pachapalayam, Perur Chettipalayam,
Coimbatore - 641 010.

Phone: +91-9677511885
Email: mechatronmotors@gmail.com

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EBDC'25

SEASON 5.0

RULEBOOK

The EBDC Season 5.0 Rulebook is the official guide governing all competition activities, including technical specifications, event procedures, safety standards, and evaluation criteria. The rulebook is mandatory for all teams to follow, as it defines eligibility, inspection protocols, and judging guidelines.

Event Date

23 - 26 Sep 2025

EBDC'2025

Season - 5.0

mechatronmotors@gmail.com

www.mechatronmotors.com