

DEPARTMENT OF MECHANICAL ENGINEERING

RIVALS 2025

6th NATIONAL LEVEL MINI-BIKE DESIGN, FABRICATION AND RACING CONTEST

RULE BOOK

EVENT DATE: 22-03-2025

LAST DATE FOR REGISTRATION: 15-03-2025

RIVALS 2025

6th NATIONAL LEVEL MINI BIKE DESIGN, FABRICATION AND RACING CONTEST

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SECTION 1

1.1 Introduction

1.1.1 About Our College

Karpagam Institute of Technology (KIT) founded by a far-sighted educationist, Dr. R. VasanthaKumar, who with a noble aim, wanted to make higher education in engineering and technology accessible to everyone, is sited at NH47 near Eachanari, Coimbatore.

The college stands out as a premier learning hub with the mission of imparting excellence in technical education and research. It recognizes the meritorious students with educational scholarships. A team of dynamic faculty, diverse student community and the state-of-art facilities available in the premises brand the institution as a querencia. The pedagogy followed in the institution equips our students to be on par with the latest technological developments. It creates a milieu which provides a platform for scholarly development, independent thinking and personal growth and also equips them with the employability skills, through practical training in the industries which are indispensable to take their career growth a step higher. Students at KIT find themselves involved in both co-curricular and extra-curricular activities. The college provides equal opportunities in sports and fine arts to showcase their talents thereby aiding in their overall development. Alumni's valuable feedback is also taken to train our students as per the industrial requirements.

1.1.2 About our Mission

The Karpagam Charity trust was promoted in the year 1989 by Dr.R.Vasanthakumar, B.E. (Hons), D.Sc., Chairman and Managing Trustee, with the vision to serve and to lead the VISION.

KIT is incepted with the vision of providing quality education that transforms individuals into intellect who will add newer dimensions to the technology revolution by fostering research, entrepreneurship, innovation and to remain a valuable resource for the industry and society.

- To provide quality education and training in Engineering and Technology in preparing students to contribute to the technological, economic and social development of the country.
- To create an ambience in facilitating research and new ideas towards creativity, innovation and entrepreneurship and to set students on the path to leadership.
- To provide opportunities for the students to get the needed additional skills in making them industry ready.
- To inculcate in the students a sense of professional ethical values and to instill in them a spirit of understanding of the needs of the society.

1.1.3 The Trust

The Karpagam Charity Trust was formed in the year 1989 with the aim of providing good educational facilities to the people of the area, catering to the needs of the poor and serving the society in general through charitable deeds.

Dr.R.VASANTHAKUMAR., B.E.(Hons), D.Sc., Managing Director of Karpagam Group of Industries and a leading Industrialist in Coimbatore, is the Managing Trustee of Karpagam Charity Trust. He is known for his drive and dedication. The philanthropist in him urged him to start a college and thereby serve the cause of higher education by bringing it to the reach of the poor and needy.

Shri.K.MURUGAIAH., B.E., Advisor of Karpagam Educational Institutions, is an equally dedicated and able person, without whom the "Karpagavirutcham" would not have taken strong roots and spread its branches.

For more details visit our website: <http://karpagamtech.ac.in/>

SECTION 2

2.1 Overview of Event

RIVALS 2025 is a National Level Mini-Bike Design and Fabrication contest conducted by Department of Mechanical Engineering from Karpagam Institute of Technology.

2.1.1 Team Eligibility and Requirements

Team Name:

Every team should have an inspirational and meaningful name.

Team Logo:

Every team should have an attractive team logo.

Team Captain:

Every team requires a team captain and vice team captain.

Discipline:

Every team member must be diploma/undergraduate/postgraduate student of any discipline.

Driver:

Every team should have two drivers; driver must be minimum of 18 years old. The driver should have a valid driving license and the same will be verified during the event.

Faculty Advisor:

Every team must have a **Faculty Advisor** but his presence is not mandatory.

Team Member:

Every team requires a **minimum of 4 members and maximum of 5 members**. The members of the team must be from the same college/university.

2.1.2 Registration Requirement and Procedure

Step by Step Detail of Registration:

Register your team online using <https://rivals.karpagamtech.ac.in/> or Google form <https://forms.gle/ZFHVY84Vjm3vQo9A7>

- All the correspondence should take place from the Team's e-mail id or Team captain's e-mail id only.
- After registration, during the mail correspondence the Name of the Team, Name of the Captain, Name of the College and Team ID should be mentioned for the quick and prompt reply.

Registration fee for each team is INR 3,000/- (Three thousand only) and this registration fee will not be refunded in any case.

Once the team has been registered the payment should be done through following methods:

After online registration and the payment confirmation, a copy of the online registration form (attested by HOD/Dean of the respective College/University) and the bank deposit slip must be mailed to rivals@karpagamtech.ac.in

For payment Related Queries:

Mr.R. Ramesh Babu,
Assistant Professor
Mechanical Engineering
Mob.No: 80721 36490

2.1.3 Safety Requirements:

Driver's Equipment:

1. The drivers must use a helmet, gloves and shoes during the dynamic rounds.
2. The Driver seat should be properly fixed and rigid.
3. Each team must have two drivers and both of them must possess a valid driving license which should be produced to inspection team during the event.

2.1.4 Technical Specifications:

The following requirements and restrictions will be enforced throughout the technical inspection. Noncompliance of any of these must be corrected and the bike should be re-inspected before the bike is allowed to operate under power.

1. Once the bike has been presented for jury inspection in the design events then until the completion of the process no modification should not be carried out in the bike.
2. The Bike must maintain all required specifications throughout the competition.
3. **Wheelbase:** The bike must have a wheelbase of maximum 1200 mm. The wheelbase is measured from the center of ground contact of the front and rear tires with the wheels pointed straight ahead.
4. **Overall Length:** The bike must have an overall length of maximum 1600 mm. The length is measured from the front end of the bike to the rear end of the bike.

5. Width: The bike must have an overall width of maximum 590 mm.

6. Height: The bike must have an overall height of maximum 900 mm.

7. Ground Clearance: The bike can have a maximum ground clearance of 220 mm.

8. Bike Identification: All the teams will be given a particular Bike number, and the Bike will be known by this number in the whole event. Teams are required to have a team name with an impressive team logo along with the college logo which is to be placed on the Bike's body. Teams are advised not to place any logos on the front of the Bike because the Bike number will be placed on the front of the Bike along with the event logo.

9. Manufacturing Cost:

Teams are required to bring the cost estimation details. Only the technical cost of the bike will be taken into consideration and during dynamic round teams are required to bring their original bills.

10. Weight: The weight of the bike should not exceed 80 kg.

11. Suspension: The bike must be equipped with a proper suspension system.

12. Engine Specifications:

Category 1: 80 CC

ENGINE:	
Layout	Single cylinder, Air-cooled, Two-Stroke
Displacement	Max 80.00 cc
Fuel System	Carburetor / Fuel Injection
GEARBOX and FINAL DRIVE:	
Type	Automatic, Manual
Transmission Type	Belt / Chain
CHASSIS and SUSPENSION:	
Frame	Any
Front suspension	Any
Rear suspension	Any
WHEELS and TYRES:	
Wheel Type	Alloy or Spokes
Wheel Size (Front/Rear)	Less than 16 inch diameter
Tyre	Tube or Tubeless
BRAKES:	
Front	Drum / Disc
Rear	Drum / Disc
OTHERS:	
Starter	Electric or Kick
Fuel Capacity	5 Litres
Top Speed	60 Km/hr (advised)

Category 2: 100 CC

ENGINE:	
Layout	Single cylinder, Air-cooled, Two-Stroke
Displacement	Max 100.00 cc (6.10 Cubic Inches)
Fuel System	Carburetor / Fuel Injection
GEARBOX and FINAL DRIVE:	
Type	Automatic, Manual
Transmission Type	Belt / Chain
CHASSIS and SUSPENSION:	
Frame	Any
Front suspension	Any
Rear suspension	Any
WHEELS and TYRES:	
Wheel Type	Alloy or Spokes
Wheel Size (Front/Rear)	Less than 16 inch diameter
Tyre	Tube or Tubeless
BRAKES:	
Front	Drum / Disc
Rear	Drum / Disc
OTHERS:	
Starter	Electric or Kick
Fuel Capacity	15 Litres
Top Speed	80 Km/hr (advised)

Category 3: E Bike

The minimum weight of the prototype without the rider should be 35Kg.

Wheelbase	1150 mm to 1350 mm
Ground clearance*	Minimum 150 mm in Vehicle laden condition
Handlebar length	Minimum 450 mm
Handlebar height	Minimum 900 mm
Seat height	Minimum 750 mm
Overall length	Should not exceed 1800 mm
Overall width	Should not exceed 750 mm
Overall height	Should not exceed 1200 mm
Wheel & Tyre	
Diameter of rim	10 to 12 inches
Tire width	3 to 3.5 inches
Wheel Size*	16 to 18.5 inches

Powertrain

- Battery Pack 48 V to 72 V
- Lithium-Ion Batteries with a maximum capacity of 1.5 kW
- BLDC/PMSM/DC Brushed maximum 1000 w (Rated power)
- Hub or mid drive type (If the mid-drive motor is used, only belt/chain/gear transmission only)
- If belt/chain/gear transmission is used it should be properly covered.

General Instructions

- No on-board charging systems are allowed.
- Each team can have its own charging system design, but the charger Input voltage is fixed at 230V 50 Hz AC.
- Proper Plugs should be used for connecting the Li-ion battery charger to the battery pack, there should not be any loose running wires.

SECTION 3

Challenge:

The teams have to compete in two rounds, static round and the dynamic round. Points are distinctively divided for the two rounds.

3.1 Static Round (1000 pts)

JUDGEMENT CATEGORIES AND POINT DISTRIBUTION:

3.1.1 Documentation required: During the static round soft copy as well as hard copy of all reports given below are required.

1) Overall Design Report: This report should contain the design methods, detailed spec-sheet of the bike & the calculations used for the overall design.

3.1.2 Technical Inspection (T.I):

Objective: The objective of Technical Inspection round is to determine the ability of the bike meet to meet the requirements and restrictions of RIVALS rules. T.I is a non-scored activity.

- Each Bike must pass all parts of Technical Inspection and testing before it is permitted to participate in any dynamic event. The exact procedures and instruments employed for inspection and testing are entirely at the discretion of the Chief Technical Inspector.
- Bikes must be presented for technical inspection in finished condition, i.e. fully assembled, complete and ready-to-run. Technical inspectors will not inspect any bike presented for inspection in an unfinished state.

Corrections: If a Bike does not comply with the rules, then correction must be done to be included in re-inspection process.

Questionnaire:

There will be a questionnaire round and any of the team members will be questioned by the judges. Questions will be related to manufacturing and other technical aspects of the bike. Engineering practices of the teams will also be evaluated.

Cost report:

In this report, the cost of the components used in the bike must be specified. It is cross checked by the inspection team. The actual cost must not vary with that in the report.

Manufacturing Level: Good engineering practice will reflect a great manufacturing quality. The bike will be examined by the judges at the time of Dynamic Event. So the participating teams are advised to manufacture the bike with pre-planned strategies so that the bike would be able to compete in several tasks and tests.

Points distribution for static round:

S.NO.	CATEGORY	POINTS
1.	Design Evaluation	300
2.	Cost Report	200
3.	Innovation	250
4.	Presentation	250
5.	Total	1000

Technical Specification Sheet:

S No	Technical Specifications	Details
1	Overall Length	
2	Overall Width	
3	Overall Height	
4	Overall Weight	
5	Wheel Base	
6	Ground Clearance	
7	Engine	
8	Frame Material	
9	Brakes i) Front ii) Rear	
10	Suspension i) Front ii) Rear	
11	Fuel Tank Capacity	
12	Transmission/ Final Drive Ratio	
13	Tyres i) Front, ii) Rear	
14	Battery Details	

3.2 Dynamic Round:

Point distribution for Dynamic Round:

S.NO.	CATEGORY	POINTS
1.	Brake Test	-
2.	Acceleration Test	-
3.	Figure of '8'	300
4.	Endurance	700
5.	Total	1000

3.2.1 Dynamic Tests:

1. Brake Test: All the bikes have to pass the brake test to participate in any of the Dynamic Events. The bike must stop in a straight line after the brake is applied. Each bike will be given 2 attempts to pass the brake test. And in case if the bike passes the test in the first attempt it will not be given further trials.

Note: The Brake Test and Acceleration test does not have any points, but it is mandatory for the teams to qualify this round to participate in the Dynamic Round.

2. Acceleration Test:

Objective: The acceleration event evaluates the Bike's acceleration in a straight line on flat pavement.

Procedure: The bike will accelerate from a standing start over a distance of 100 m on a flat surface. The foremost part of the bike will be staged at exactly behind the starting line. The time taken to accelerate would be measured.

Penalty: Cones Down or Out: A two (2) second penalty will be added for each DOO (including entry and exit gate cones) that occurred on that particular run to give the corrected elapsed time.

Did not Attempt (DNA): If the bike did not attempt or if it does not complete the event, then those bikes would receive DNA.

3. Skid Pad test:

Objective- The objective of the skid-pad event is to measure the Bike's cornering ability on a flat surface while making a constant- radius turn.

1. **Skid Pad Layout-** There will be two (2) pairs of concentric circles in a figure of eight pattern. The centers of these circles will be 2m apart. The inner circles will be 2.5 m in diameter, and the outer circles will be 4.5 m in diameter. The driving path will be the 2 m path between the inner and outer circles. The bikes will enter and exit through gates on a 2 m wide path that is tangential to the circles where they meet. The line between the centers of the circles defines the start/stop line. A lap is defined as traveling around one of the circles from the start/stop line and returning to the start/stop line.

Procedure:

- The track is laid on as shown and the bike will enter the track perpendicular to the figure eight. They must take one full lap on the right circle to establish the turn and the bike must move on to the left circle to complete the lap. This completes one lap and will be timed. Immediately upon finishing the circle the lap will be completed, and the bike will exit the track. The bike will exit at the intersection moving in the same direction as entered.
- A driver has the option to take a second run immediately after the first.

Penalties:

- **Cones Down or Out:** A penalty of 1 second will be added to the time for every cone that is knocked down or out (including the gate cones).
- **Unfinished:** Bike's that have gone out of the track will continue as long as they have not gone off course will be classified as Unfinished. Bike's that do not follow procedure, i.e. run an incorrect number of laps or run the Laps in the wrong sequence will also be classified as unfinished.
- **Legs touching the ground:** A penalty of 2 seconds will be added to the time for every time the rider touches the ground with any/both of his feet.

4. Endurance event:

Objective: The endurance event is designed to evaluate the bike's overall performance, reliability and efficiency.

Procedure & Specifications:

In general, the teams completing the laps in the shortest time will earn the maximum points available for this event. The endurance distance is approximately 1.2 km.

1. The track consists of various obstacles at different places like standing water, muddy sand, converging bridge, rocks, etc.

Endurance Penalties: The penalties in effect during the endurance event are listed below:

- **Cone down or out:** 1 second per cone. This includes cones Before and after start/finish line.
 - **Off Course (OC):** For an off Course, the driver must re-enter the track at or prior to the missed gate or a twenty (20) second penalty will be assessed.
- **Legs touching the ground:** A penalty of 2 seconds will be added to the time for every time the rider touches the ground with any/both of his feet.
- **Running Out of Order:** less than 2 Minutes.

SECTION: 4

EVENT RULES AND ORGANIZER AUTHORITY:

4.1 Official Announcement:

All the official announcements and the information regarding the competition will be displayed on the website <https://rivals.karpagamtech.ac.in/>

After completion of registration, the team ID and other information's will be sent through the emails to the respective team email ID. The rules will be same throughout the event and any amendments done will immediately be informed to the entire participating team through email / Instagram page.

4.2 Rules Authority:

All the authority of rules is under RIVALS organizing Committee. Official announcements from RIVALS Organizing Committee shall be considered part of and have the same validity as these rules. Query regarding event questions or intent of these rules will be resolved by the Technical committee of RIVALS.

4.3 Validity of Rules:

The rules and other information related to RIVALS 2025 is valid until the completion of the event and schedule as decided by the RIVALS 2025 Organizing Committee.

4.4 Rules Compliance:

By entering into RIVALS, a national level competition, the team members & faculty advisors of the entering university agree to comply with, and be bound by, the rules of RIVALS 2025. All the rules & procedures are issued or announced by the RIVALS 2025 Organizing Committee. All team members, faculty advisors and other university/college representatives are requested to cooperate with us and follow all the instructions from competition organizers, officials and judges.

4.5 Behavior:

All the members of each and every team are required to follow the rules laid by RIVALS 2025 Organizing Committee, during the competition. Any team fails to follow the rules will result in 20% reduction of overall score or elimination from the event. Arguments with officials may also result in the team being eliminated from event.

4.6 Smoking and Illegal Material:

Alcohol, illegal drugs, weapons or other illegal material are strictly not allowed 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 applies to both team members and faculty advisors. Any use of drugs, or the use of alcohol by an underage individual, will be reported to the authorities for prosecution.

4.7 Unsportsmanlike Conduct:

In the event of unsportsmanlike conduct, the team will receive a warning from an official. A second violation will result in expulsion of the team from the competition.

4.8 Official Instructions:

Failure of a team member(s) to follow an instruction or command directed specifically to that team or team member(s) will result in a twenty five (25) point penalty. There should not be any direct involvement of industrial experts in Designing and manufacturing of the bike.

4.9 Arguments with Officials:

Argument with, or disobedience to, any official may result in the team being eliminated from the competition. All members of the team may be immediately escorted from the grounds.

4.10 Trash Clean-up:

Cleanup of trash and debris is the responsibility of the teams. The team's work area should be kept uncluttered. At the end of the day, each team must clean all debris from their area and help with maintaining a clean paddock.

4.11 Competition Objective - A Reminder:

The RIVALS event being organized by Department of Mechanical Engineering is a challenge of design engineering and manufacturing competition that requires performance demonstration of mini bikes and is NOT a race. Engineering ethics will apply. It is recognized that lots of hard work has been put in by the teams for an entry into many events. It is also recognized that this event is an "innovation enhancement experience" but that it often becomes confused with a high stakes race. In the heat of competition, emotions peak and disputes arise. The officials of RIVALS are involving trained volunteers in organizing the event and maximum effort will be put in to settle the disputes in an equitable, professional manner

SECTION 5

Awards and Prize Money

Category	Cash Prize
80 CC	1 st Prize - Rs.10,000 2 nd Prize - Rs.7,500 Best Innovation – Rs.5,000
100 CC	1 st Prize - Rs.10,000 2 nd Prize - Rs.7,500 Best Innovation – Rs.5,000
E Bike	1 st Prize - Rs.10,000 2 nd Prize - Rs.7,500 Best Innovation - Rs.5,000
Best Rider Best Team Auto clickers	Memento Memento Memento
Total	Rs.67,500

SECTION 6

CONTACT DETAILS:

For final registration: <https://forms.gle/ZFHVY84Vjm3vQo9A7>

Instagram page: https://www.instagram.com/rivals_2k24/?igshid=YmMyMTA2M2Y%3D

Email ID: rivals@karpagamtech.ac.in

Website: <https://rivals.karpagamtech.ac.in/>

For any sort of query contact us:

Student Coordinators

1. R.VINOSHA – 9952855254
2. A ABDUL ANSAF – 8148081035
3. S GOKULA KANNAN - 8072798563

Faculty Coordinators

1. Mr.A.J. INFANT JEGAN RAKESH - 8778649003
2. Mr.R. RAMESH BABU - 80721 36490

RIVALS 2025

6th NATIONAL LEVEL MINI-BIKE DESIGN, FABRICATION AND RACING CONTEST

Organized by the Department of Mechanical Engineering of Karpagam Institute of Technology,
Coimbatore – 641 105.

UNDERTAKING LETTER

Student Name Mr./Ms. _____

Registration No. _____

Department _____

Year _____ **Sem:** _____

1. I undertake that I will follow all the rules & regulations and policies listed in the RIVALS 2025 rule book and event hosting Institution.
2. I am at my own risk willing to go for the "RIVALS 2025" conducted at Karpagam Institute of Technology, Coimbatore.
3. I will follow all the rules and regulations of the country and instructions of the faculty / team Leader, host institution and place of stay.
4. I accept that failure to follow any rules & regulation, policies and guidelines, instruction or any complaint against me shall attract disciplinary action against me as deemed appropriate by authorities.
5. I have taken the consent of my parents and they have given me the permission to go on my own risk and they have agreed to pay all the expenses for participating in the event.
6. I solemnly affirm and sign below, after reading the contents of this undertaking.

Student's signature with date

Parent's signature with date

Tutor / Advisor / Mentor signature with date

Verified by,

(Head of the Department signature with date)