1. Common Guidelines

A. **Team Formation:** An **individua**l may participate or construct a team of a minimum of **2** and a maximum of **10** members.

B. **Registration:** Only Team leader has to fill the form with all members details through https://www.cac-cuchd.in/

C. **Deadline:** 18 May 2024 .

D. Teams can participate in **multiple competitions** simultaneously.

E. The **evaluation criteria** for each competition differ, but the **weightage largely depends** on the following factors:
   a. AutoCAD **design** of the hardware and flowchart of software.
   b. **Prototype** (Hardware must be 50% functional, with proper software)
   c. Innovation and creativity.
   d. **Budget:** Utilization report and any additional required funding.
   e. Requirement list with accurate **cost estimates**.
   f. All Teams have to pitch their **Ideas and Products**.
   g. The utilization of solely presentation and software is **prohibited**.
   h. Hardware for each category is **checked** as per the challenge.
   i. In the initial round, the student team is required to invest once in the production of hardware. Only upon successfully advancing through all rounds will the finalist teams become eligible for financial support.

F. Only **two teams** will be nominated to the **finals** if they qualify all **rounds** of the university.

G. **Guidelines For Drone Category :** The prospective participant desiring to engage in the drone category is required to thoroughly review all guidelines provided on the website and ensure conformity with all aforementioned criteria.

2. GUIDELINES FOR THE WATER ROCKET CHALLENGE

The team must design their own water rocket maximum Commercial water rocket kits won't be allowed. Following specifications and rules address many well-known safety issues of water rockets, but are not expected to cover all design possibilities.

Rocket Material:

- The weight of empty rocket with empty fuel tank must not exceed 0.5 kg (11 Pounds)
- The maximum allowed total height of the rocket is 76.0 cm.
- The rocket shall be made of low-density materials such as paper, plastic, duct tape, and glue. Use of Metal, ceramics, and other high-density materials are prohibited.

Rocket Nose Shape

While a sharper nose improves aerodynamics and accuracy, for safety the nose must be somewhat rounded and made of a soft, flexible material. The nose must not form a sharp, hard point. It should not break a windshield or injure anyone

Fuel Tank

- The water-fuel tank must be a plastic soda-bottle, not a water bottle, with a maximum size of 2.5 liters. A soda bottle makes an ideal fuel tank for a water rocket; the bottle should be strong, light-weight, and designed to be pressurized.
- The rocket fuel must be water, driven by pressurized air to produce thrust. Water and air are non-toxic and non-combustible, and readily available. Air pressure must not exceed 70 psi, roughly 1/2 of the burst pressure of soda-bottles.

There will be two grading phases:

- **Phase 1:** The rocket with maximum airtime.
- **Phase 2:** Ascend in any direction (choice of the contester) in order to get the longest distance covered
- Total time of **10 minutes** will be given to each team for evaluation in each phase.

3. GUIDELINES FOR THE RC CRAFT CHALLENGE

Event Description

- A match is played by a single team in one go, with each team consisting of 1 RC Plane.
- Construct an RC Plane of wingspan 150cm* and a maximum weight up to 4Kg (including battery and other onboard components). The RC Plane fits the mentioned specifications as long as the design and construction are primarily the original work of the team. A ready-made RC plane is not acceptable, if found so, the team will be disqualified.

The RC Plane

Construction: The design and construction of the RC plane should be primarily the original work of the team and must justify the dimensions parameters for the competition:

- The RC Plane dimensions should not exceed the **Wingspan of 150 cm.** Exceeding the specific design requirement will be disqualified.
- RC Plane weight should be **up to 4Kgs** (including battery and other onboard components).
- There is no restriction on the use of any material for RC Plane bodies or wings. Exploration of other materials and building methods is greatly encouraged. In addition, the use of lead in any portion of the aircraft (payload included) is strictly prohibited.
- The RC Plane is restricted to **electric motor propulsion only**. There are no restrictions (make or model) on the electric motor. **Only a single motor configuration is allowed** (no multiple motors).
- Gearboxes, Belt Drive Systems, and Propeller Shaft Extensions are allowed as long as a one-to-one propeller to motor RPM is maintained.
- RC Plane must be powered by a commercially available Lithium- Polymer battery pack (3 cell-12.6 Volt to 6 cell-22.2 Volt Lithium Polymer battery pack). Homemade batteries are NOT allowed.

- If a separate battery is used for the radio system, the battery pack must have enough capacity to safely drive all the servos in the RC Plane, taking into consideration the number of servos and potential current draw from those servos. A battery pack with a minimum capacity of 1000 mAh must be used for the radio system. Battery voltage regulators or Battery Eliminator Circuit (BEC) are allowed.

Rules & Regulations

- The RC Plan shall be hand tossed (launched) by throwing the aircraft using one (1) hand grasping the fuselage or it can use a launch pad of a maximum stretch of 5 meters.
- There is no limit on the number of steps taken during the launching action, but the person/RC plane must remain inside the launch zone before and after releasing the RC Plane.
- Only one member of the team can enter the pre-marked launch zone and the pilot must be outside the pre-marked launch zone during the tossing action. In the case of individual participation, the pilot should be within a pre-marked zone.
- Actions not permitted and invalidate the flight attempt, are using more than one hand to toss the RC Plane, Tossing the Plane from any other part of the RC Plane other than the fuselage, or running with the aircraft during launch.
- Each team will have 120 seconds to complete preflight checks, energize the propulsion system, and check the controls and hand-launch the RC Plane. If the team exceeds 120 seconds penalty points will be incurred in the flight round score.
- Only one take-off launch attempt is permitted per round.
- Once take-off occurs, RC Plane is required to perform innovative manoeuvres in a span of 120 seconds.
- After the completion of 120 seconds, Land the RC Plane in the designated landing zone.

Evaluation Criteria

- The RC Plane will be evaluated on various parameters such as design, construction, and innovation.

- Every aspect of the RC Plane will be observed for scoring which includes the connection of various parts, fixing of components, materials used, aeromodelling, etc.
- The plane performing the best manoeuvres will be announced as a winner.
- Any deviation from the above criterion will lead to immediate disqualification.

4. GUIDELINES FOR THE MAZE SOLVER

A match is played by a *single team* in one go, with each team consisting of *1 Autonomous Wireless Bot* that can solve mazes. An individual may participate or construct a team of a minimum of *2* and a maximum of *10* members. There will be a maze track race for it, you have to complete the whole track within the given time period. The team with the minimum amount of time taken to complete the track will win the competition.

MAZE SOLVER BOT

The participating bot (Micromouse) must be wireless and autonomous. Any robot kit or building material may be used if the bot fits inside a box of *15 centimeters length*, *15 centimeters wide and 15 centimeters height* at any point in time. It can be circular / Rectangular in style. Bot must. Maximum weight should not be more than *5Kgs* including battery, however, a tolerance of *5%* in weight is acceptable. Also the design and construction are primarily the original work of the team. Participants need to ensure:

- The Micromouse must be controlled autonomously with no human aid. A MicroMouse shall not use an energy source employing a combustion process.
- A MicroMouse shall not leave any part of its body behind while navigating the maze.
- A MicroMouse shall not jump over, fly over, climb, scratch, cut, burn, mark, damage, or destroy the walls of the maze.
- No wireless communication between bot and operator will be allowed. Bluetooth, RF Module, etc not allowed on bot.

- The controller unit should be embedded in the robot and cannot be placed outside the robot.
- The robot must be powered by a power source such as a battery fixed on the robot. It cannot be powered by a stationary power source connected to the robot by a cord.

Maze Solver Competition Scoring:

Fastest reaching robot to the finish line, will be considered the winner. Maximum 3 trials will be given to a team. Best time out of 3 trials will be considered. No human touch is allowed once the robot activation button is pressed.