

# ROBO SOCCER

## OBJECTIVE:

TEAMS COMPETE TO SCORE GOALS BY MANEUVERING A BALL INTO THE OPPONENT'S NET USING THEIR ROBOTS. THE GAME IS TYPICALLY PLAYED IN A KNOCKOUT TOURNAMENT FORMAT, WHERE THE WINNING TEAM ADVANCES TO THE NEXT ROUND.

## BOT SPECIFICATIONS:

- EACH ROBOT MUST FIT WITHIN 30CM X 30CM X 30CM (L X B X H) WITH A 5% TOLERANCE.
- THE MAXIMUM WEIGHT OF THE ROBOT SHOULD NOT EXCEED 5 KG, WITH AN ADDITIONAL 5% TOLERANCE (250 GRAMS) ALLOWED.
- ROBOTS CAN BE EITHER WIRED OR WIRELESS. IF WIRED, THE CABLE MUST BE AT LEAST 4M LONG AND REMAIN LOOSE THROUGHOUT THE GAME.
- ROBOTS MAY USE A MAXIMUM OF 12V DC AT ANY GIVEN TIME. ONLY BATTERY-OPERATED ROBOTS ARE PERMITTED. BATTERY VOLTAGE WILL BE VERIFIED AT THE MOTORS BEFORE THE EVENT.
- ONLY ELECTRIC MOTORS ARE ALLOWED; THE USE OF IC ENGINES OR COMPRESSED AIR MECHANISMS IS STRICTLY PROHIBITED.
- PRE-BUILT RC CARS OR READY-MADE CHASSIS ARE NOT ALLOWED. THE ROBOT MUST BE DESIGNED AND ASSEMBLED BY THE PARTICIPATING TEAM.
- ROBOTS MAY INCLUDE MECHANISMS TO PUSH OR FLICK THE BALL, BUT SUCTION OR ADHESION-BASED METHODS FOR HOLDING THE BALL ARE NOT PERMITTED.
- EACH ROBOT MUST PASS A TECHNICAL INSPECTION AT LEAST 30 MINUTES BEFORE ITS MATCH TO ENSURE COMPLIANCE WITH ALL SPECIFICATIONS.

## ARENA SPECIFICATIONS:

- THE GAME IS PLAYED ON A RECTANGULAR FIELD (E.G., 8FT X 4FT).
- GOALS ARE 30CM WIDE ON BOTH ENDS.
- A LIGHTWEIGHT TENNIS BALL IS TYPICALLY USED AS THE GAME BALL

## MATCH FORMAT:

- THE COMPETITION IS CONDUCTED IN A KNOCKOUT FORMAT.
- MATCHES HAVE TIME-LIMITED HALVES, WITH ELIMINATORS, SEMI-FINALS, AND FINALS HAVING DIFFERENT TIME DURATIONS.
- TIEBREAKERS INVOLVE SUDDEN-DEATH OR ADDITIONAL OVERTIME ROUNDS.

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## GAMEPLAY RULES:

- THE MATCH BEGINS WITH ROBOTS POSITIONED IN DESIGNATED ZONES AND A REFEREE SIGNALING THE START.
- TEAMS MUST MANEUVER THE BALL USING THEIR ROBOTS WHILE AVOIDING RULE VIOLATIONS.
- ROBOTS MAY BLOCK OPPONENTS, BUT DAMAGING OR INTERFERING WITH CONTROL SYSTEMS IS NOT ALLOWED.
- A GOAL IS COUNTED ONLY IF THE BALL FULLY CROSSES THE GOAL LINE.
- AFTER SCORING, THE GAME RESTARTS FROM THE CENTER.
- TECHNICAL TIMEOUTS ARE ALLOWED FOR MINOR REPAIRS (LIMITED TO 1 MINUTE PER GAME).

## JUDGING & FAIR PLAY:

- THE TEAM WITH THE HIGHEST NUMBER OF GOALS AT THE END OF THE MATCH WINS.
- IN CASE OF A TIE, EXTRA TIME OR PENALTY-BASED DECISIONS MAY BE USED.
- THE REFEREE'S DECISIONS ON GOALS, PENALTIES, AND MATCH DURATION ARE FINAL.



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# ROBO-SUMO

## OBJECTIVE:

THE GOAL OF ROBO-SUMO IS TO DESIGN AND BUILD AN AUTONOMOUS OR MANUALLY CONTROLLED ROBOT THAT CAN COMPETE IN A SUMO-STYLE MATCH BY PUSHING THE OPPONENT'S ROBOT OUT OF THE CIRCULAR ARENA WHILE ADHERING TO THE SPECIFIED RULES AND CONSTRAINTS.

## ARENA SPECIFICATIONS:

- THE ARENA FEATURES A CIRCULAR PLYWOOD PLATFORM WITH A DIAMETER OF 2 METERS.
- A WHITE BORDER WILL ASSIST SUMO ROBOTS IN NAVIGATION.
- THE PLATFORM IS SLIGHTLY ELEVATED FROM THE BASE TO CLEARLY INDICATE WHEN A ROBOT HAS BEEN PUSHED OUT.

## ROBOT SPECIFICATIONS:

- CONTROL TYPE: ROBOTS CAN BE WIRED OR WIRELESS.
- MAXIMUM ONBOARD WEIGHT OF BOT SHOULD NOT EXCEED 5 KG (ADDITIONAL 5% TOLERANCE I.E. 250 GRAMS).
- SIZE CONSTRAINT: THE MAXIMUM DIMENSIONS ALLOWED ARE 30 X 30 X 30 CM (WITH A 5% TOLERANCE).
- CONSTRUCTION RULE: ROBOTS MUST BE CUSTOM-BUILT—PRE-ASSEMBLED KITS, LEGO PARTS, OR READY-MADE COMPONENTS ARE NOT PERMITTED.
- POWER SOURCE:
  - THE ROBOT MUST BE ELECTRICALLY POWERED (NO IC ENGINES ALLOWED).
  - IT MAY USE A BATTERY FIXED ON THE ROBOT OR A STATIONARY POWER SOURCE CONNECTED VIA A CORD.
- VOLTAGE RESTRICTION: THE MAXIMUM POTENTIAL DIFFERENCE BETWEEN ANY TWO POINTS ON THE BOT MUST NOT EXCEED 12.5V.
- BACKUP REQUIREMENT: TEAMS MUST HAVE SPARE BATTERIES TO AVOID DISQUALIFICATION IF THE ROBOT BECOMES NON-FUNCTIONAL DURING A MATCH.
- WIRE LENGTH (FOR WIRED BOTS): THE WIRE MUST BE LONG ENOUGH TO COVER THE ARENA AND SHOULD REMAIN SLACK THROUGHOUT THE MATCH.

# ROBO-SUMO

## RULES AND REGULATIONS:

- **TEAM COMPOSITION:** EACH TEAM MUST HAVE 2 TO 4 MEMBERS, AND PARTICIPATION IS OPEN ONLY TO CURRENTLY ENROLLED COLLEGE STUDENTS.
- **MATCH FORMAT:**
  - EACH MATCH CONSISTS OF TWO ROUNDS, 1.5 MINUTES EACH.
  - IN CASE OF A TIE, AN ADDITIONAL 1-MINUTE ROUND WILL BE CONDUCTED.
- **SCORING SYSTEM:**
  - WINNING TEAM GETS 1 POINTS, WHILE THE LOSING TEAM GETS 0 POINTS.
  - TO WIN, A ROBOT MUST PUSH THE OPPONENT COMPLETELY OUT OF THE ARENA.
  - A SUMO-BOT IS NOT CONSIDERED OUT UNTIL IT FULLY FALLS OFF THE PLATFORM.
  - HANGING OVER THE EDGE DOES NOT DISQUALIFY A SUMO-BOT.
- **POINT ALLOCATION:**
  - THE ROBOT REMAINING ON THE ARENA AT THE END OF THE ROUND IS AWARDED THE POINT.
  - IF BOTH ROBOTS FALL, THE ONE THAT TOUCHES THE GROUND LAST EARNS THE POINT.
  - IF A ROBOT BECOMES DISABLED OR IMMOBILE, THE OPPONENT WINS THE POINT.
  - THE ROBOT WITH THE MOST POINTS WINS THE MATCH (FINAL SCORING DETAILS WILL BE ANNOUNCED DURING THE EVENT).
- IF NO WINNER IS DECIDED WITHIN THE GIVEN TIME, A 2-MINUTE TIEBREAKER MATCH (DO-OR-DIE) WILL TAKE PLACE, WHERE THE FIRST POINT WINS THE MATCH.
- **RESTART CONDITIONS:**
  - IF ROBOTS REMAIN ENTANGLED FOR MORE THAN 10 SECONDS, THE JUDGE WILL RESTART THE MATCH FROM THE INITIAL POSITION.
  - ENTANGLEMENT IS DEFINED AS ROBOTS LOCKED TOGETHER WITHOUT MAKING SIGNIFICANT PROGRESS TOWARD THE ARENA'S EDGE.
- **TIME-OUTS & WEIGHT CONSIDERATIONS:**
  - ONE TECHNICAL TIMEOUT (60 SECONDS) IS ALLOWED PER TEAM PER MATCH.
  - THE 5KG WEIGHT LIMIT INCLUDES BATTERIES FOR WIRELESS BOTS AND BATTERIES PLUS REMOTE FOR WIRED BOTS.
- **CONDUCT & FAIR PLAY:**
  - PARTICIPANTS MUST FOLLOW THE RULES AND JUDGES' DECISIONS.
  - MISBEHAVIOR MAY LEAD TO DISQUALIFICATION FROM THE COMPETITION.
  - ROBOTS OR PARTICIPANTS ATTEMPTING DELIBERATE INTERFERENCE WITH OPPONENTS OR DAMAGING THE ARENA WILL BE DISQUALIFIED.
- **AUTHORITY OF ORGANIZERS:**
  - THE EVENT COORDINATORS HAVE THE RIGHT TO MODIFY RULES ON THE SPOT IF NECESSARY.
  - ALL DECISIONS REGARDING GAMEPLAY, SCORING, AND PARTICIPATION MADE BY THE ORGANIZING COMMITTEE ARE FINAL.
- **MATCH CONTROL:**
  - THE MATCH CAN BE
  - STOPPED, RESUMED, OR ENDED ONLY BY A JUDGE'S ANNOUNCEMENT.



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# LINE FOLLOWER

## OBJECTIVE:

PARTICIPANTS MUST DESIGN AN AUTONOMOUS ROBOT CAPABLE OF DETECTING AND FOLLOWING A DESIGNATED PATH—EITHER BLACK ON A WHITE BACKGROUND OR WHITE ON A BLACK BACKGROUND—TO TRAVEL FROM THE STARTING POINT TO THE FINISH LINE IN THE SHORTEST POSSIBLE TIME.

## GAMEPLAY:

- ROBOTS WILL BE POSITIONED AT THE STARTING POINT, AND THE TIMER STARTS WHEN THE RUN BEGINS.
- THE TIMER WILL CONTINUE UNTIL THE ROBOT REACHES THE FINISH LINE.
- EACH TEAM IS ALLOWED ONE TRIALS PER ROUND THAT TO CALIBRATION.
- A ROBOT MUST RESTART IF:
  - IT FAILS TO START WITHIN ONE MINUTE AFTER PRESSING THE START BUTTON.
  - IT IS TOUCHED BY A HUMAN (4-SECOND PENALTY PER TOUCH).
  - IT MOVES OFF THE TRACK.
  - THE REFEREE ORDERS A RESTART.
- CHECKPOINTS WILL BE PLACED ALONG THE TRACK:
  - IF THE ROBOT FAILS TO REACH A CHECKPOINT, IT MUST RETURN TO THE PREVIOUS CHECKPOINT.
  - IF THE ROBOT FAILS AGAIN, THE PARTICIPANT HAS THE OPTION TO SKIP THE CHECKPOINT AT THE COST OF A 20-SECOND PENALTY.
- SCORING, PENALTIES, AND TIME LIMITS WILL BE ANNOUNCED ON THE DAY OF THE EVENT.

## ROBOT SPECIFICATIONS:

- THE ROBOT MUST OPERATE COMPLETELY AUTONOMOUSLY, WITHOUT HUMAN INTERVENTION.
- MAXIMUM DIMENSIONS (INCLUDING TOLERANCE):
  - WIDTH: 280MM
  - LENGTH: 280MM
  - HEIGHT: 200MM
- MAXIMUM WEIGHT: 3 KG.
- THE ROBOT MUST BE STARTED MANUALLY USING A START BUTTON.
- LEGO PARTS AND PRE-ASSEMBLED ROBOTS ARE STRICTLY PROHIBITED.
- THE MAXIMUM VOLTAGE BETWEEN ANY TWO POINTS ON THE ROBOT MUST NOT EXCEED 12V.
- THE ROBOT CAN BE POWERED BY A 12V BATTERY MOUNTED ON THE BOT OR A STATIONARY POWER SOURCE CONNECTED THROUGH A CORD.
- SPARE BATTERIES MUST BE CARRIED BY PARTICIPANTS TO AVOID DISQUALIFICATION DUE TO POWER FAILURE DURING A TRIAL.

# LINE FOLLOWER

## TRACK SPECIFICATIONS:

- THE TRACK WILL BE MADE OF A FLEXIBLE SHEET WITH CONTRASTING LINES: EITHER BLACK LINES ON A WHITE BACKGROUND OR WHITE LINES ON A BLACK BACKGROUND.
- THE COURSE WILL FEATURE VARIOUS ANGLES, INCLUDING ACUTE, OBTUSE, AND RIGHT ANGLES, AS WELL AS CURVES.
- DISCONTINUITIES MAY BE PRESENT AT CERTAIN POINTS ALONG THE TRACK.
- CHECKPOINTS WILL BE PLACED AT KEY LOCATIONS TO ENSURE PROGRESS TRACKING.
- THE TRACK LAYOUT WILL BE REVEALED ON THE DAY OF THE EVENT.



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# DRONE RACING

## OBJECTIVE:

- TEAMS MUST DESIGN AND OPERATE A HANDMADE DRONE TO NAVIGATE THROUGH A CHALLENGING COURSE FILLED WITH HURDLES AND MANEUVERS WITHIN A SPECIFIED TIME LIMIT.
- THE COMPETITION WILL TEST THE SPEED, CONTROL, AND PRECISION OF THE DRONE AND THE SKILLS OF THE PILOT IN MANEUVERING THROUGH OBSTACLES.
- A SINGLE ROUND WILL DETERMINE THE FINAL RANKINGS BASED ON PERFORMANCE.

## DRONE SPECIFICATIONS:

- THE DRONE'S DIMENSIONS MUST BE BETWEEN 0.15M × 0.15M (MINIMUM) AND 0.70M × 0.70M (MAXIMUM), INCLUDING PROPELLERS.
- ALLOWED CONFIGURATIONS: QUADCOPTER, HEXACOPTER, OCTOCOPTER.
- THE DRONE MUST BE HANDMADE—PRE-ASSEMBLED DRONES ARE NOT PERMITTED.
- THE DRONE MUST HAVE A DISARM BUTTON FOR EMERGENCY SITUATIONS TO ENSURE SAFETY.

## GAMEPLAY & SCORING:

- THE DRONE MUST NAVIGATE THROUGH A PRE-DEFINED TRACK, CROSSING HURDLES AND PERFORMING MANEUVERS WITHIN THE GIVEN TIME LIMIT.
- EACH HURDLE AND MANEUVER CARRIES SPECIFIC POINTS—FAILURE TO COMPLETE THEM RESULTS IN NO POINTS FOR THAT SECTION.
- ONLY ONE TEAM MEMBER IS ALLOWED TO OPERATE THE DRONE DURING THE COMPETITION, WHILE OTHER MEMBERS MUST STAY OUTSIDE THE ARENA.
- PARTICIPANTS MUST BRING FULLY CHARGED BATTERIES—NO CHARGING FACILITY WILL BE PROVIDED.
- PENALTIES:
  - TOUCHING A HURDLE ADDS 10 SECONDS TO THE TOTAL TIME.
  - SKIPPING A HURDLE RESULTS IN A 30-SECOND PENALTY.

## RULES & REGULATIONS:

- THE ORGANIZERS ARE NOT RESPONSIBLE FOR ANY DAMAGE TO DRONES DURING THE EVENT.
- MISCONDUCT, SUCH AS THE USE OF ABUSIVE LANGUAGE, PHYSICAL ALTERCATIONS, OR ARGUMENTS WITH OFFICIALS, WILL RESULT IN IMMEDIATE DISQUALIFICATION.
- THE DRONE MUST COMPLETE THE TRACK IN THE SHORTEST POSSIBLE TIME WHILE MAINTAINING PRECISION AND CONTROL.
- JUDGES' DECISIONS ARE FINAL, AND PARTICIPANTS MUST ADHERE TO THEIR RULINGS.



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# ROBO-RACE

## PROBLEM STATEMENT:

PARTICIPANTS MUST BUILD AND OPERATE A MANUALLY CONTROLLED ROBOT, EITHER WIRED OR WIRELESS, TO NAVIGATE A TRACK FILLED WITH OBSTACLES AND SHARP TURNS IN THE SHORTEST POSSIBLE TIME.

## GAMEPLAY:

- THE ROBOT BEGINS AT THE STARTING LINE, AND THE TIMER STARTS AS SOON AS THE RACE BEGINS.
- THE ROBOT MUST STAY ON TRACK; IF IT MOVES OFF-COURSE, IT MUST RESTART FROM THE LAST CROSSED CHECKPOINT WHILE THE TIMER CONTINUES RUNNING.
- SKIPPING AN OBSTACLE INCURS 30 SECONDS PENALTY POINTS, WHICH ARE ADDED TO THE TOTAL TIME.
- PENALTIES:
  - 3 SECONDS ADDED IF ONE WHEEL MOVES OUT OF THE TRACK.
  - 12 SECONDS ADDED IF THE ENTIRE ROBOT MOVES OUT OF THE TRACK.
  - 10 SECONDS ADDED FOR MANUAL INTERVENTION (HAND TOUCH).
- THE RACE ENDS WHEN THE ROBOT CROSSES THE FINISH LINE, AT WHICH POINT THE TIMER STOPS.
- SCORING AND PENALTY DETAILS WILL BE DISCLOSED ON THE DAY OF THE EVENT.
- IF BOT STOPS FUNCTIONING FOR MORE THAN 3 MINUTES WILL BE DISQUALIFIED

## ROBOT SPECIFICATIONS:

- THE ROBOT CAN BE WIRED OR WIRELESS BUT MUST BE MANUALLY CONTROLLED.
- MAXIMUM DIMENSIONS: 300MM X 300MM X 300MM (L X B X H). ANY BOT EXCEEDING THIS LIMIT WILL BE DISQUALIFIED.
- MAXIMUM WEIGHT: 5 KG.
- THE BOT MUST NOT BE BUILT FROM LEGO PARTS OR PRE-ASSEMBLED KITS. IT MUST BE ELECTRICALLY POWERED—IC ENGINES ARE PROHIBITED.
- POWER CAN BE SUPPLIED VIA ONBOARD BATTERIES OR A STATIONARY POWER SOURCE CONNECTED VIA A WIRE.
- MAXIMUM VOLTAGE: 12V ACROSS ANY TWO POINTS OF THE ROBOT.
- TEAMS SHOULD CARRY SPARE BATTERIES TO AVOID DISQUALIFICATION DUE TO POWER FAILURE.
- IF USING A WIRED CONNECTION, THE WIRE MUST BE LONG ENOUGH TO COVER THE RACE TRACK AND REMAIN SLACK AT ALL TIMES.

# ROBO-RACE

## RACE TRACK SPECIFICATIONS:

- THE TRACK WILL HAVE A SINGLE START AND FINISH LINE. THE SURFACE MAY HAVE IRREGULARITIES.
- VARIOUS OBSTACLES WILL BE PRESENT TO SLOW DOWN THE ROBOT'S MOVEMENT.

## RULES AND REGULATIONS:

- EACH TEAM CAN HAVE UP TO 4 MEMBERS.
- TWO TEAM MEMBERS WILL BE DESIGNATED AS THE ROBOT HANDLER, RESPONSIBLE FOR CONTROLLING THE ROBOT DURING THE GAME.
- OTHER TEAM MEMBERS MUST STAY OUTSIDE THE COMPETITION ZONE.
- MISBEHAVIOR BY ANY PARTICIPANT MAY RESULT IN EXPULSION OR DISQUALIFICATION.
- DELIBERATE INTERFERENCE WITH OTHER ROBOTS OR DAMAGING THE ARENA WILL RESULT IN DISQUALIFICATION.
- ALL DECISIONS REGARDING SCORING, GAMEPLAY, TIMING, AND PARTICIPATION MADE BY THE ORGANIZING COMMITTEE ARE FINAL.
- TEAMS MUST RESPECT THE REFEREE'S CALLS AND JUDGMENTS.



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**THE JUDGES' DECISION WILL BE  
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THE EVENT SCHEDULE AND RULES  
MAY BE MODIFIED AS NECESSARY.**