

Lawrence
Technological
University®

Be curious. Make magic.

LAWRENCE TECHNOLOGICAL UNIVERSITY
ROBOFEST®

UMC

Unknown Mission Challenge

Mission tasks are totally unknown. Robots are built and programmed at the competition.

V 2.0 – Final Version for 2025 Season

This file can be found on the **UMC** page on the website
Coaches are responsible for communicating rules updates to participants

www.robofest.net

robofest@ltu.edu

248-204-3568

Room J233 Taubman Complex, LTU

21000 West 10 Mile Road, Southfield, MI 48075, USA

1. UMC Overview

Learning Objectives:

- Autonomous navigation
- Critical thinking
- Computer programming logic
- Use of sensors
- Adjusting to environmental conditions
- Problem solving
- Learning on the fly
- Design and construction of robots

Synopsis:

- **An Open Category competition**, which will take place at the World Robofest Championship
- There are no qualifying competitions for this challenge
- Mission tasks will be totally unknown until the day of competition
- The goal of this challenge is to provide an opportunity to develop problem-solving skills on the fly without any help from adult coaches

2. Age Divisions and Team Size

- Age Divisions
 - Junior Division (Grades 5-8)
 - Senior Division (Grades 9-12)
- Team Size: Maximum four (4) members
- Team Registration Fee: \$90 at the World Championship (Registration fee at local event may be different)
- Teams must review and abide by: [2025 General Rules](#)
- Each team member must bring the signed [Robofest Consent and Release Form](#) on the day of the event, if not completed on-line

3. Robot Requirements

- Teams may only use one of the following approved robot platforms, and must bring their own robot parts
 - LEGO NXT sensors, motors, parts, and one NXT controller
 - LEGO EV3 sensors, motors, parts, and one EV3 controller
 - LEGO SPIKE Prime/Robot Inventor and one SPIKE Prime/Robot Inventor Controller
 - VEX IQ sensors, motors, parts, and one VEX IQ controller
- No limit to part quantities, except for the limit of one controller
- Pre-assembled robots cannot be used
- All robot components must be unassembled at the beginning of the competition
- Sensor or motor multiplexers are not allowed
- Any programming language is allowed and team must bring their own computer to program the robot
- No internet or cell phone use allowed
- Robot must be started using a button or sensor on the robot (not by tablet, computer, etc.)

4. Allowed/Not Allowed

Allowed

- Robot Kit – All parts disassembled
 - LEGO NXT
 - LEGO EV3
 - LEGO SPIKE Prime/Robot Inventor
 - VEX IQ (Gen 1 and Gen 2)
- Computer/Tablet
- Programming software
- Multiple programs
- Measuring tape/stick

Not Allowed

- Pre-assembled robots
- Starting jigs
- Build Instructions
- Multiplexers

5. Competition Procedures

- Only participants are allowed in the work area, at team tables, and around game fields throughout the competition day
- Jr and Sr divisions will have different missions
- The Unknown Mission Challenge is unveiled at the start of the event. No adult help is allowed after the unveiling
- Teams must share the practice fields and are limited to one practice run at a time if other teams are waiting
- Team ID must be visible on the robot
- Robots will be impounded at the end of the work time
- Teams will have “official” runs that will be judged
- Winners will be decided based on the scoring of their individual runs
- The exact method of determining final scores will be unveiled at competition

6. Preparation

Although everything is built and programmed at the UMC competition, there are still some things that teams can do to prepare.

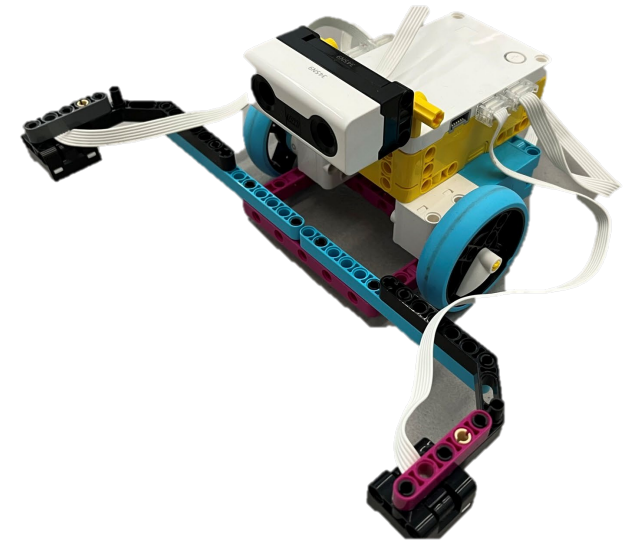
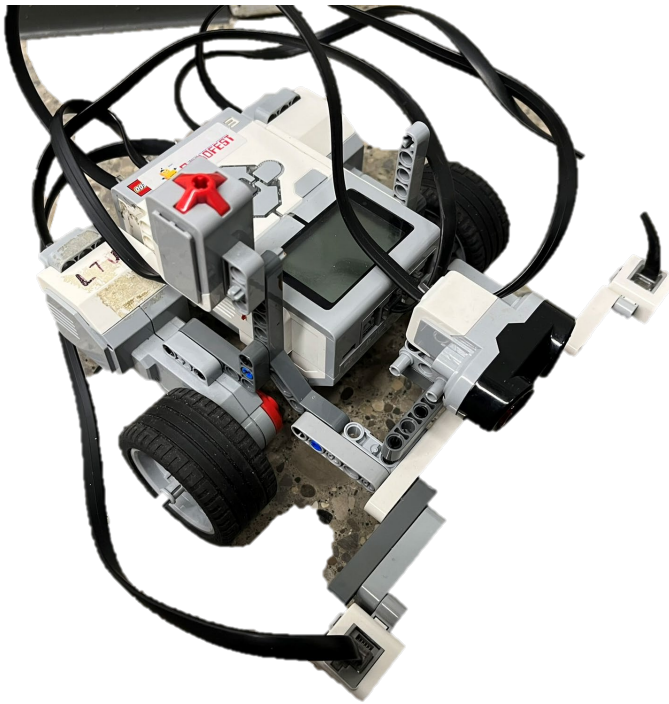
Useful Skills

- Math/operations using robot
- Displaying values
- Following a line or an edge of a table
- Measuring distances using rotation sensor
- Measuring the distance to an object using a distance sensor
- How to use gears
- Converting rotations or degrees to mm or inches
- Measuring time
- Counting
- Using variables to store/recall information

Recommended Sensors/Parts

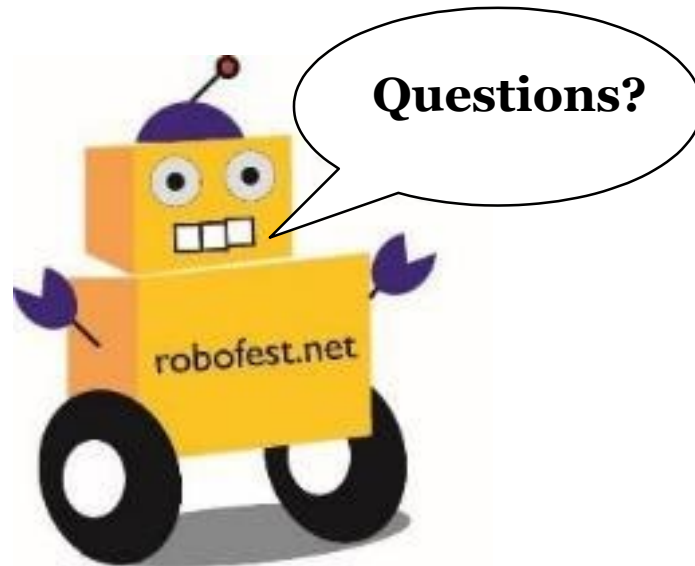
- Color/light sensors (at least 2)
- Rotation sensor (part of the motor, but know how to use them)
- Touch sensor
- Distance sensor
- Enough motors for a robot base and a manipulator (robot arm)

Good General Purpose Robots- Robofest workshop robots



Practice by building one of these, then developing your own design

Little Robots, Big Missions



UMC Committee Members

Prof. Elmer Santos*

Scott Eisele

Daniel Oliver

Curtis Sharif

* Committee Chair

Send questions to: robofest@LTU.edu