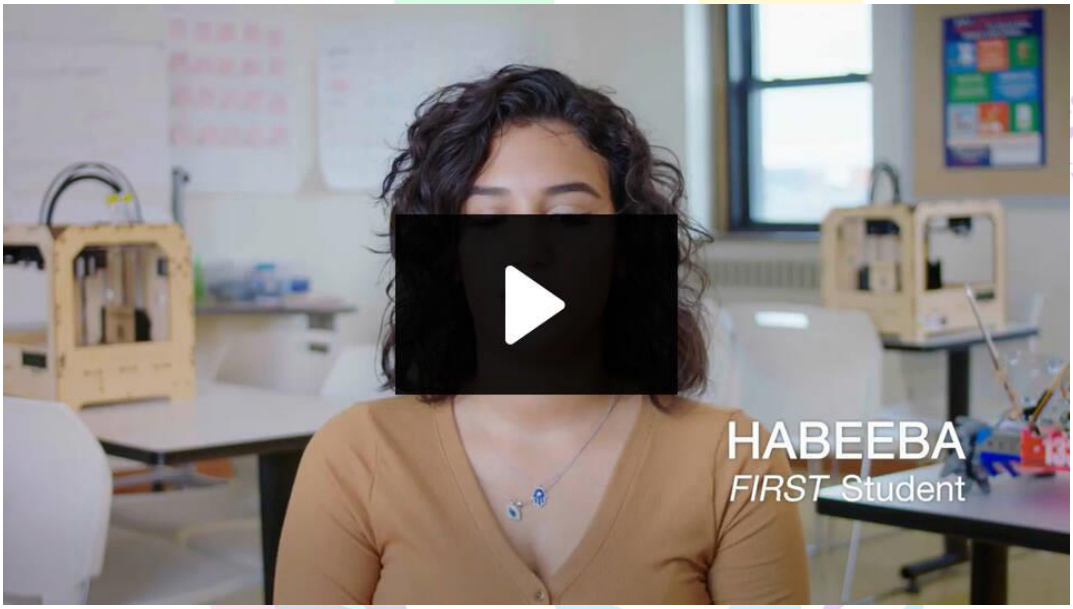
STEMSmarts Inc.
Robotics Club, Camps & Competitive Teams

FIRST® TECH Challenge (FTC) Competitive Robotics Team

About

***FIRST*® Tech Challenge (FTC)** is a robotics competition for middle and high school students (grades 7-12) to design, build, and program robots to compete in an alliance format. Teams are challenged to solve real-world problems through robotics while developing STEM skills and fostering teamwork. FTC is one of the six major robotics programs organized by FIRST.



FIRST Tech Challenge | STEM Robotics Program for Grades 7-12

Key Aspects

1) **Design and Build:** Teams design and build their own robots using a reusable platform - goBilda.
2) **Programming:** Teams program their robots using various levels of Java-based programming.
3) **Competition:** Teams compete in an alliance format against other teams, scoring points by completing tasks on a field.
4) **Awards:** Teams are eligible to win various awards for robot performance, design, innovation, outreach (Engineering & general community), and other accomplishments.
5) **Outreach:**
   a) Teams are encouraged to connect with the local engineering community to recruit mentors who can help them learn
   b) Teams are encouraged to engage in community outreach activities and showcase their work.
6) **Scholarships:** Participants can potentially qualify for over **$26 million** in college scholarships.

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FAQ

1) **What will my child learn participating in FTC?**
   - **STEM Education:** FTC helps students develop STEM skills like problem-solving, teamwork, and critical thinking.
   - **Mechanical, Electrical Engineering Concepts:** Students use the engineering principles to design and build their robots.
   - **Machine Learning, April Tag Technologies:** Students could incorporate ML principles for object identification which is a key part of their robot's performance.
   - **Computer Science & Programming:** Students use Java APIs to program their robot to perform tasks. They incorporate April Tag, Pedro Pathing techniques to strategize their robot's movements.
   - **CAD Designs:** Students use Auto CAD and other design tools as part of their design process
   - **3D Printing/ Fabrication:** Students using 3D printing and other Fabrication methods to create custom parts for their robot.
   - **Engineering Portfolio:** Teams are recognized for their efforts to document their journey throughout the season – both technical and other activities.

2) ***How FTC will be an advantage for my child?***
   - Participating in a Varsity League for Robotics which is valuable for their profile as college admission offices look for commitment, time management and achievement in the activities.
   - Learn several life skills that will make them ahead of their peers. Problem solving, Critical Thinking, Teamwork, Project Plan, Effective communication, Presentation skills, Budgeting, Managing finances, Making Connections and many more
   - Learn the Engineering Design Concepts, learn and follow a real-life engineering process
   - Learn Java programming with Machine Learning & AI Concepts

3) ***How does it work?***
   - FTC teams can be community club team or a school club team.
   - Up to 15 kids participate in a team. STEMSmarts will keep team count it to 8 to 10
   - Students in 8th thru 12th grade can participate. STEMSmarts policy is that the students should in 9 – 12th grades.
   - In September, FIRST releases the game challenge based on a theme.
   - Teams will start building their robot and program to tackle the challenge in 2 ½ minutes. Initial 30 seconds the robot will be programmed to perform autonomously. For the next 2 minutes 2 drivers, 1 coach and a human player counterpart will control & assist the robot movements to complete missions and score points.
   - Teams will be partnered up randomly with another team to form an appliance for every match at the league events and Championships. The alliance teams will have to work together to accomplish missions to score highest points.

-]At the Championship events,
  - the teams will compete for Championship positions.
  - teams will also participate in a judging session in which they will be evaluated for various awards. See the section Awards for more info.
- They participate in League events & League championship events. Florida has 5 leagues. Tampa's league called R.O.B.O.T League.

4) What's our experience with FTC?

- Coached our son's community team along with another parent 2021 to 2023
- Team has been placed #1 in the State for 2 consecutive years
- Placed 3rd in Inspire award at the State Championship
- Semifinalist at the State Championship

5) What's the season timeline? What is the event format?

- Season runs from September to April
- Teams participate in 4 League Games → League Championship → State Championship → World Championship

6) What is the time commitment?

- Participation the Robotics League is same as a **Varsity Sports team participation**. Both attendance and active participation determines team's success.
- Preseason meetings, weekly up to 4 hours to learn all aspects of FTC, building a robot & learn to program the basic and advanced movement techniques of the robot. Timeline: Mar to Aug
- Regular season - weekly up to 4 hours meetings in person & up to 4 hours offline. Timeline: Sep to Mar
- Longer weekly meetings as we enter the tournament season. Timeline: Nov to Mar
- Additional time for outreach, fund raising events planning and execution – see Team Advancement & FTC Awards Sections

7) How much does it cost to participate?

- **Student Registration Fee: $150 (One Time)**
- **Pre-season (Mar – Aug): Fees $200 per month**
  - **Meetings on weekends for up to 4** hours to learn all aspects of FTC and start building the robot.
  - All team members are expected to participate in this activity and take advantage of the learning opportunity.
  - Once regular season starts the team will be accelerating their activities to tackle the Robot Game challenge.
- **Regular Season (Sep – Mar): $300 per month**
  - **Weekly meetings of 6 to 8 hours per week in-person and 4 hours per week offlin**e (beginning only). More hours may be added as we get into the tournament season - typically Nov to Mar).
  - We plan to have a max 8 team members.

- Fees would have to be adjusted depending on the final number of students.
- Additional fee to be determined if the team participates in any events beyond March.

8) What is expected from Parents/ Families of the participants?

- Ensure the student keeps the attendance & actively participates
- Volunteer at the FTC events
- Help the team with Marketing, Fundraising & Technical & Non-technical community outreach – see Team Advancement & FTC Awards Sections
- Mentor students in any of the areas (Not necessarily only technical area)

FTC 2025 - 26 Challenge & Game Overview

FTC Awards

6.1 Team Judged Awards Overview and Schedule

Most *FIRST* Tech Challenge awards fall into two broad categories: Machine, Creativity, and Innovation (MCI), and Team Attributes (TA), with two additional special awards: Inspire and Think (Figure 6-1).

Figure 6-1: Award hierarchy

- **MCI awards** recognize the technical accomplishments of teams in the planning, design, construction, operation, and control of their ROBOTS.
- **TA awards** recognize teams who have developed strong partnerships with their community. This includes recruiting members, fund-raising, and the teams' outreach efforts to spread *FIRST*'s message about the benefits that can come from the study of math, science, and technology.
- The **Think Award** recognizes teams who masterfully document their team's process and product using their PORTFOLIO.
- The **Inspire Award** recognizes teams who excel in MCI, TA, and Think award accomplishments. This team is an all-around inspiration for others

The JUDGES will gather information from the teams through several different pathways (Figure 6-2). All teams will have the opportunity to submit a written PORTFOLIO which should document aspects of their teams which directly support the judged award criteria or information which they wish the JUDGES to consider. All teams are encouraged to prepare for a judging interview session where the team can present a prepared oral presentation to a small panel of JUDGES about their team followed by a Q&A session. After all the judging panels have finished, the JUDGES compare notes and may elect to follow up with the teams in the pit area during the competition and conduct more informal pit interviews. JUDGES may also accept feedback about teams at the event from other event volunteers to help inform their understanding of the team.

Figure 6-2: Sources of information for Judged Awards

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Team Advancement

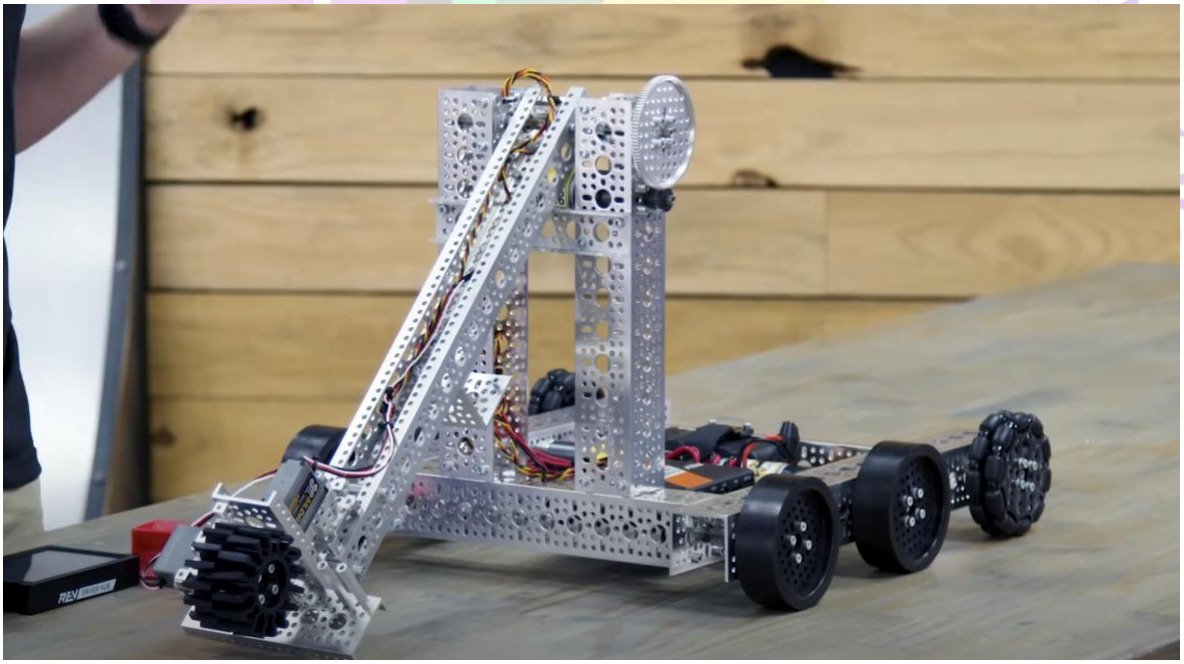
ROBOT LEAGUE CHAMPIONSHIP → FL STATE CHAMPIONSHIP

FL STATE CHAMPIONSHIP → FIRST WORLD CHAMPIONSHIP

Up to 8 Teams advance (varies per event) to the next level having won the awards or being at the top on Robot Game

FTC Robot sample

https://www.youtube.com/watch?v=qDwFq_XWpNE



FTC 2025 Florida State Championship games

The 2025 Florida State Championship was telecasted on its entirety on YouTube. Here are some clips of the Finals matches. I could only clip 60 seconds of the 180. Do watch these games fully.

- FTC 2025 Florida State Championship Final Match1
  https://youtube.com/clip/UgkxZbzoXNPLGC66kasA--Re1Z0PnEVngLNr?si=FX6riuGwBvB5X4Mc

- FTC 2025 Florida State Championship Final Match2
  https://youtube.com/clip/UgkxbxFE1rS_jwI972WPofjiqwvlZ8n7-4eo?si=9Iz83_xt7-xNHjuO