



Introduction to FTC

Patrick R. Michaud
University of Texas at Dallas
Jonsson School of Engineering

North Texas FTC Affiliate Partner

patrick.michaud@utdallas.edu

Welcome and Introductions

FIRST Progression of Programs



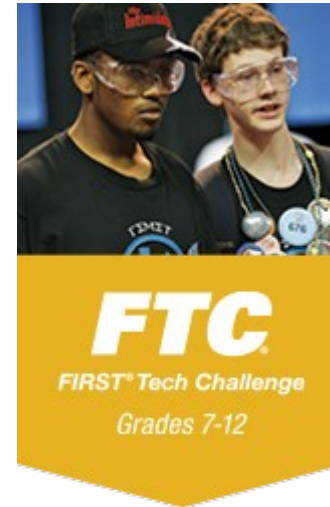
Grades K-4
14,000+ teams
86,000 players

LEGO elements



Ages 9-14
Grades 4-8
35,200 teams
280,000+ players

LEGO Mindstorms



Ages 12-18
Grades 7-12
5,900 teams
59,000 players

TETRIX/Matrix kits



Ages 14-18
Grades 9-12
3,650 teams
91,000+ players

120 lbs, custom

FIRST Tech Challenge

Teams design, build, and program robots to compete in an alliance against other teams.



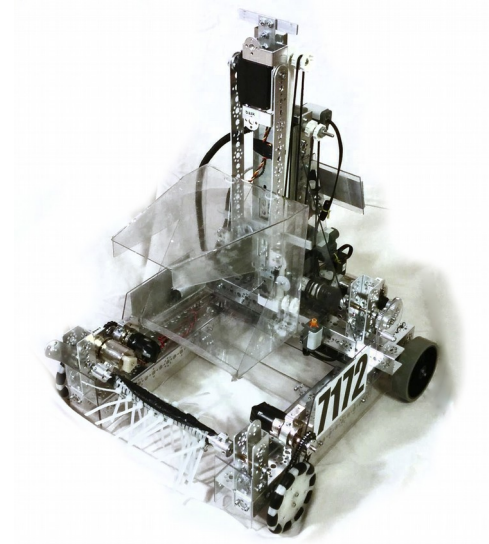
Teams including coaches, mentors, and volunteers develop strategy and build robots based on engineering principles.

FTC competitions occur at regional, state, national, and international levels

FIRST Tech Challenge

Grades 7-12

Up to 15 team members



Robots built using a wide variety of materials and kits of parts

Game challenge changes every year

2011: Bowled Over

2012: Ring it Up

2013: Block Party

2014: Cascade Effect

2015: Res-Q

2016: Velocity Vortex

2017: Relic Recovery

2018: Rover Ruckus

FTC Game

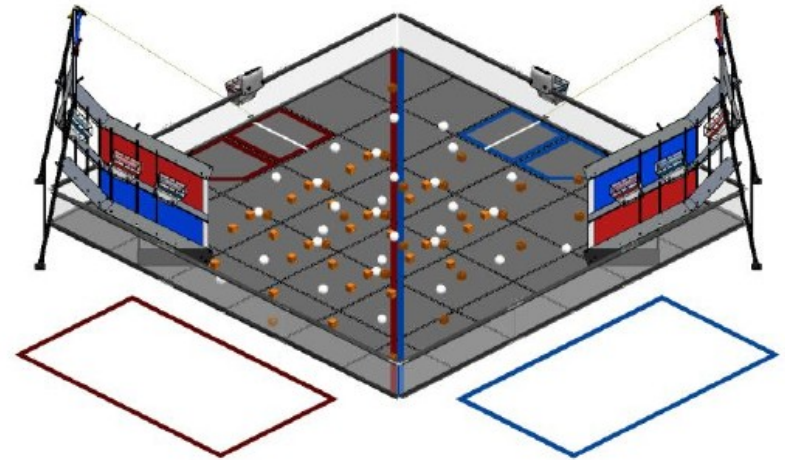
Two alliances of two teams each (four robots)

12' x 12' field with game elements

Robots perform tasks to earn points

30 second “autonomous” portion

2 minute “tele-operated” (driver control) portion including 30 second “endgame”



2017-2018 FTC Season

September - October:

- Game release

- Coaches clinics and workshops

- Scrimmages

November – January:

- Qualifier Tournaments

- League Meets & Tournaments

February: Regional championship

April: World Championship, Houston

Starting a team – things you need

Registration – firstinspires.org dashboard

Robot

- Control set (phones, gamepads)

- Electronics set (modules, sensors)

- Competition set (hardware, chassis)

- Computer / software

Practice Field

Tools

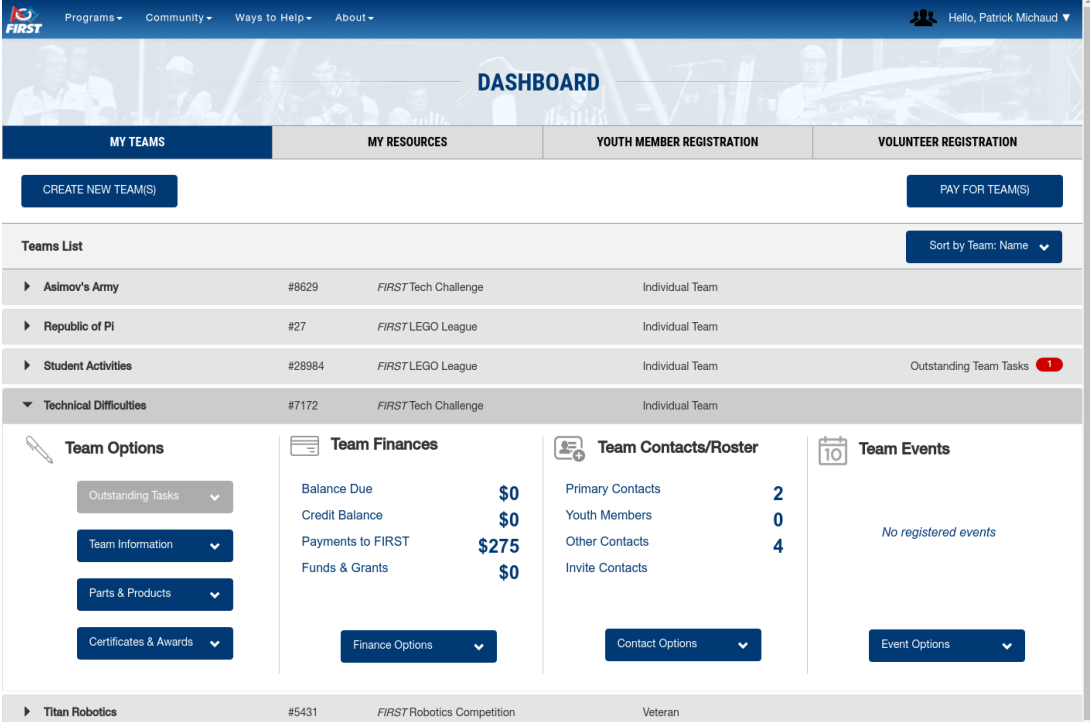
Engineering Notebook

Team Registration - FIRST

Create an account
at firstinspires.org

“Create new teams”

Invite a 2nd coach
(required)



The screenshot shows the FIRST Dashboard interface. At the top, there are navigation links for Programs, Community, Ways to Help, and About. The user is logged in as Patrick Michaud. The dashboard has four main tabs: MY TEAMS, MY RESOURCES, YOUTH MEMBER REGISTRATION, and VOLUNTEER REGISTRATION. Below the tabs, there are buttons for 'CREATE NEW TEAM(S)' and 'PAY FOR TEAM(S)'. A 'Teams List' section displays a table of teams with columns for team name, number, league, and type. Below the table, there are four panels: 'Team Options' (with buttons for Outstanding Tasks, Team Information, Parts & Products, and Certificates & Awards), 'Team Finances' (showing Balance Due: \$0, Credit Balance: \$0, Payments to FIRST: \$275, and Funds & Grants: \$0), 'Team Contacts/Roster' (showing Primary Contacts: 2, Youth Members: 0, Other Contacts: 4, and Invite Contacts), and 'Team Events' (showing 'No registered events').

| Team Name | Team Number | League | Team Type |
|------------------------|-------------|----------------------|-----------------|
| Asimov's Army | #8629 | FIRST Tech Challenge | Individual Team |
| Republic of PI | #27 | FIRSTLEGO League | Individual Team |
| Student Activities | #28984 | FIRSTLEGO League | Individual Team |
| Technical Difficulties | #7172 | FIRST Tech Challenge | Individual Team |

Pay for team registration, receive team number

Don't need to complete team roster until first
event (e.g. meet or qualifier)

Registration and TIMS

FTC Team Information Management System

Register team, pay registration fee, obtain team number

Two coaches required

Purchase robot kits via FIRST

Youth Team Member System

Team members create an account at firstinspires.org

Parents electronically sign consent forms

Apply for team membership

Team coach accepts student applications

Complete prior to first event

Important things to do

Join NorthTexasFTC Google Group

FTC related discussions, advice, announcements

Bookmark roboplex.org

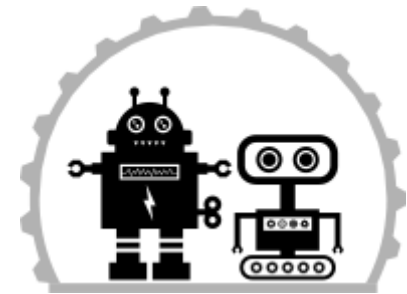
Calendar of events

Resources

FTC clinics and workshops

Apply for a FIRST in Texas Grant

firstintexas.org/grants



Robot components

Chassis / mechanical kits

REV Robotics, Tetrrix, Actobotics, Matrix

Control and Communication Sets via FIRST

Option 1: Moto G Phones, OTG cables, USB hub

Option 2: Moto G Phones, Gamepads, OTG, USB hub

Electronics Set

REV Expansion Hub, sensors, switches

Robot control system overview

Smartphone based

ZTE Speed

Motorola Moto G 2nd gen

Motorola Moto G 3rd gen

Motorola Moto G4 Play

Motorola Moto E4

Google Nexus 5

Samsung Galaxy S5



Controllers for motors, servos, sensors

Programming in Blocks, OnBotJava, or Android Studio (Java)

More robot components

Software development environment

FTC Robot Controller and Driver Station apps

Web browser

-or-

Android Studio

Other items

Commercially available hardware and building materials, limited to one degree of freedom

3D printed parts

Practice Field

Field sets (game elements) – changes every year

Purchase from andymark.com

Options: Full field, half-field, quarter-field

SoftTiles flooring – 2'x2' gray rubber floor tiles

AndyMark: \$230 for a set of 36

SoftTiles.com: \$5.80 per tile (36 needed for full field)

Field perimeter walls

AndyMark: \$595 + shipping

Build your own or do without

Tools

See roboplex.org/ftc/resources/ for suggestions

Engineering Notebook

Required for winning judged awards

Get started early, don't wait

Document everything you can

Read Game Manual Part I for organization details

See award winning notebooks at FTC site

Engineering Notebook

Required for all judged awards

Documentation of team's robot design and activities for the season:

| | |
|------------------|-------------|
| sketches | processes |
| discussions | obstacles |
| team meetings | reflections |
| design evolution | analyses |

Start early, don't wait until just before event

See award winning notebooks at [FTC Team Resource](#)

FTC competition basics

Judged awards

Qualification matches

- Randomly selected alliances for each match

- Teams earn a W-L-T record (RP) and tiebreaker points

Elimination matches (“playoffs”)

- Top four teams from qualification matches become “alliance captains”

- Captains select other teams to form playoff alliances

- Elimination bracket, two wins needed to advance

- Winning alliance and Finalist alliance

Top teams advance to next level

2017-2018 North Texas competition events

League play:

Group of 10-16 teams that compete together in multiple events (Nov-Jan)

“Self-organized” by teams

3+ “League Meets”

Culminates in a “League Tournament” (usually Jan)

Qualifying tournaments:

Single-day events for up to 36 teams

Organized by “qualifier hosts”

To be held on Saturdays in Nov, Dec, Jan

Still looking for qualifier host sites

2017-2018 League

Teams in a League:

- Plan their League Meets and League Tournament

- Determine event dates

- Find locations and equipment for events

- Recruit volunteers such as referees and judges

Contact Patrick Michaud @ UTD if you have a group of teams interested in forming a league

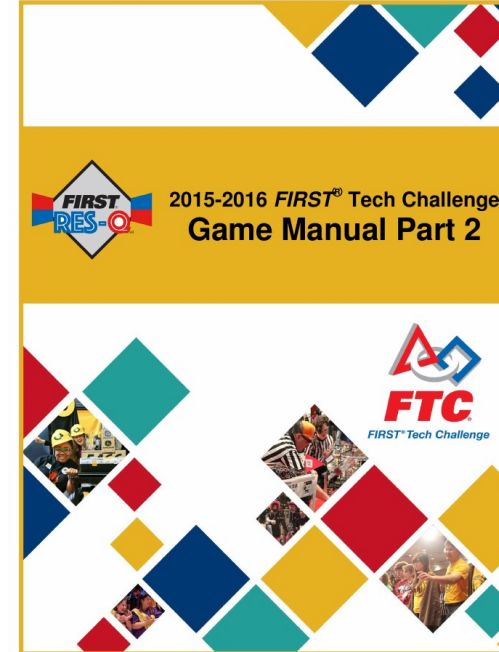
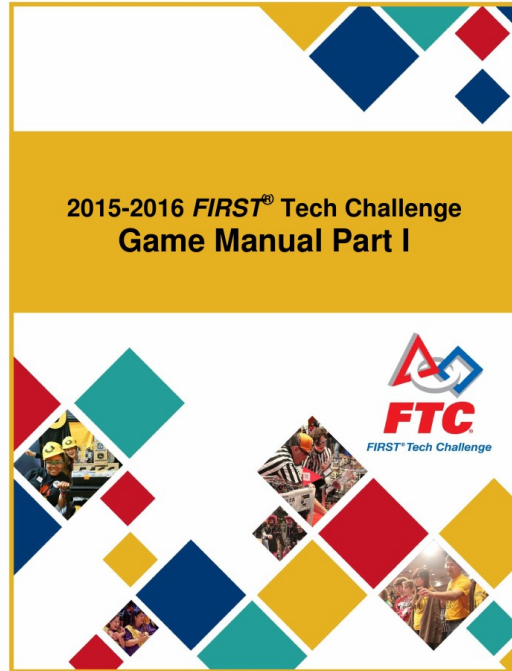
Qualifying Tournaments

Single-day competition for up to 36 teams

Judging, 5-6 qualification matches, playoffs, awards

Dates/locations for Qualifying Tournaments to be determined

Game Manuals



Tournament overview
Robot inspection rules
Advancement criteria
Award descriptions

Game field description
Game rules
Scoring
Penalties

Game Analysis and Strategy Tips

Read and review rule summary and penalties prior to working on strategy or scoring

Think in terms of competition level

Qualifier → Regional → World

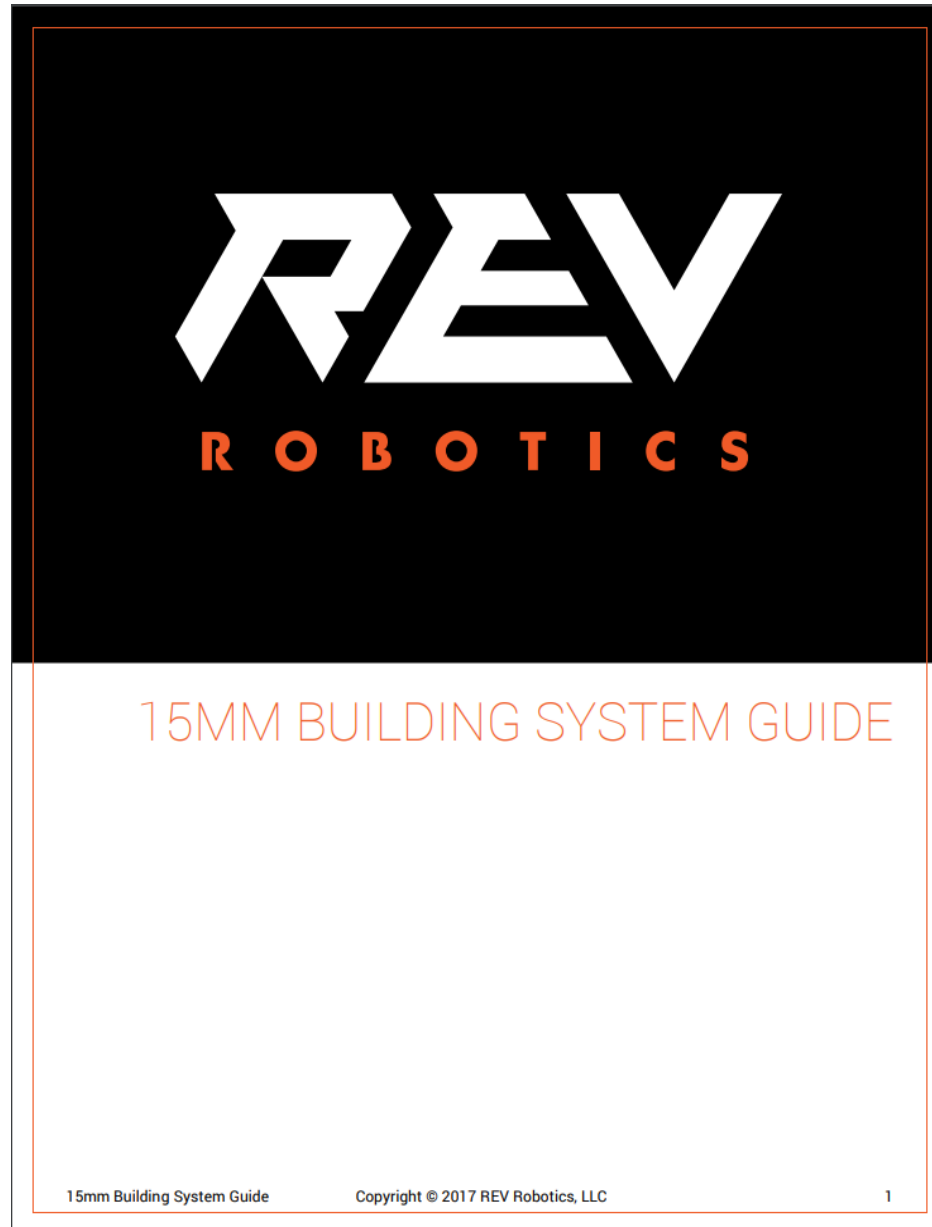
Always plan and think as an alliance

Top robots will “carry” weak alliance partners

Top robots will partner well with strong robots

Reliability is way more important than score-ability

Robot Building using REV Robotics



Basic robot build