

FTC Coaches Workshop - Day 1
Introduction to FTC
and Building with TETRIX

Patrick R. Michaud
pmichaud@pobox.com

University of Texas at Dallas
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Welcome and Introduction

FIRST Progression of Programs



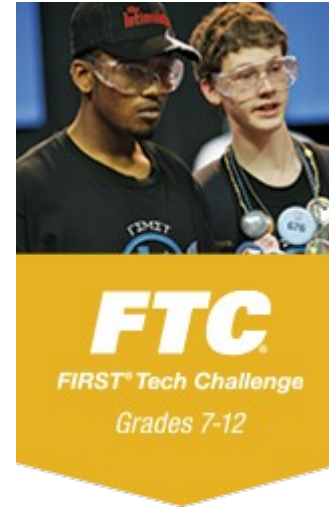
Ages 6-8
4,500 teams
27,000+ players
100+ expos

LEGO elements



Ages 9-14
26,000 teams
267,000 players
1,200+ qualifiers
136 championships

LEGO Mindstorms



Grades 7-12
4,500 teams
44,000 players
300+ meets/events

TETRIX/Matrix kits



Grades 9-12
3,000 teams
75,000 players
100+ meets/events

120 lbs, custom

* based on 2014/2015 projections
<http://www.usfirst.org/aboutus/first-at-a-glance>

FIRST Tech Challenge

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



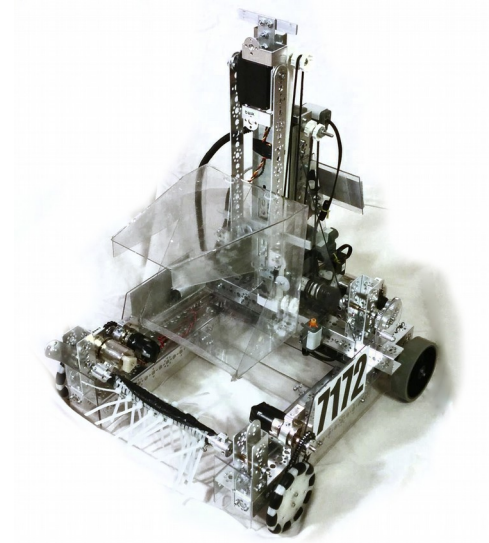
Teams including coaches, mentors, and volunteers develop strategy and build robots based on engineering principles.

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: ???

FTC Game

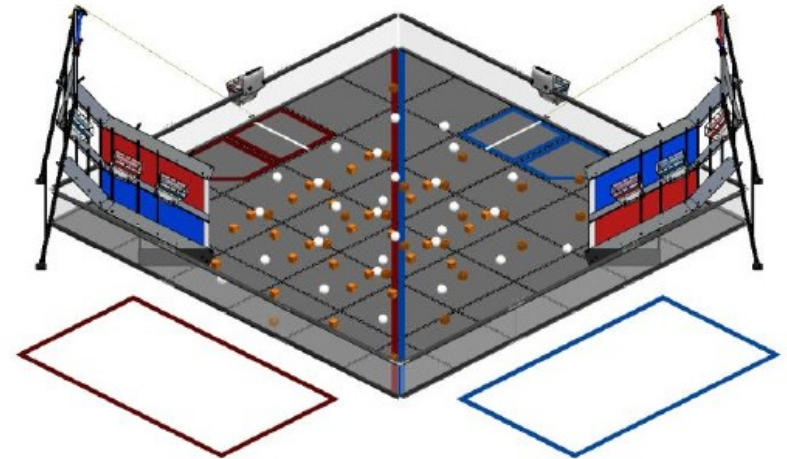
Two alliances of two teams each (four robots)

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”



Who is here?

1. Name
2. School / affiliation
3. Experience
4. What do you want to get from this workshop?

2016-2017 FTC Season

September through December:

- Coaches clinics

- Scrimmages

- League meets

January: Qualifiers, League championships

February: Regional championship, UT-Arlington

March: South Super Regionals, Georgia

April: World Championship, Houston

Starting a team – things you need

Registration – usfirst.org and TIMS

Robot

Chassis, motors, sensors, control systems, software

Practice Field

Tools

Engineering Notebook

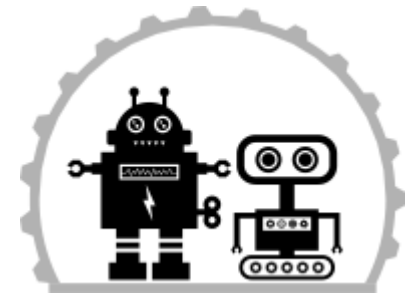
Important things to do

Join NorthTexasFTC Google Group

FTC related discussions, advice, announcements

Bookmark roboplex.org

Calendar of events, resources



Apply for a FIRST in Texas Grant

firstintexas.org



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

Parents electronically sign consent forms

Apply for team membership

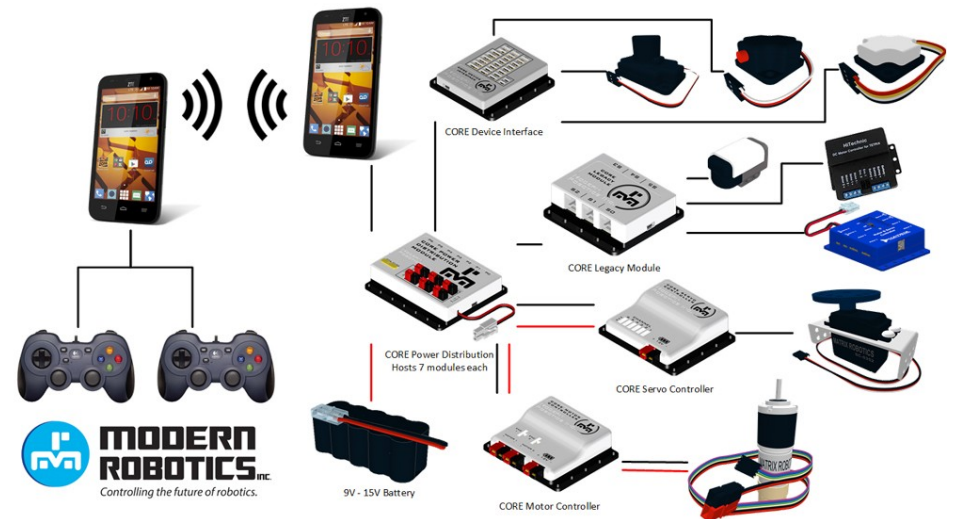
Team coach accepts student applications

Complete prior to first event

Robot control system

Smartphone based

ZTE Speed or
Motorola Moto G phones



Controllers for motors, servos, sensors

Programming in Android Studio (Java)

Robot-controller app

Driver station app

Robot components

Chassis / mechanical kits

Tetrix, REV Robotics, Actobotics, GoBilda, Matrix

Electronics Set

REV Robotics

Via FIRST Storefront or revrobotics.com

Control and Communication Sets via FIRST

Option: Joysticks included or excluded

More robot components

Software development environment

FTC Robot Controller and Driver Station apps

Android Studio (Java)

MIT AppInventor

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 set or half-field sets

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: \$659 + shipping

Build your own or do without

Tools

See roboplex.org for suggestions from teams

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

Judged awards

Qualification matches

- Randomly selected alliances

- Teams earn a W-L-T record (QP) and ranking 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

Advancement criteria

1. (optional Qualifier “host”)
2. Inspire Award Winner
3. Winning Alliance Captain
4. Inspire Award 2nd place
5. Winning Alliance, 1st team
6. Inspire Award 3rd place
7. Winning Alliance, 2nd team
8. Think Award
9. Finalist Alliance Captain
10. Connect Award
11. Finalist Alliance
12. Rockwell Collins Innovate
13. Finalist Alliance, 2nd team
14. PTC Design Award
15. Motivate Award
16. Control Award

Qualifier events

Single-day competition for up to 36 teams

Robot inspection

Judging

Qualification matches

Elimination matches

Awards

FTC League Play

Leagues formed of 10-16 teams

Each league has three or more “league meets” over several weeks

- Five or more qualification matches per team

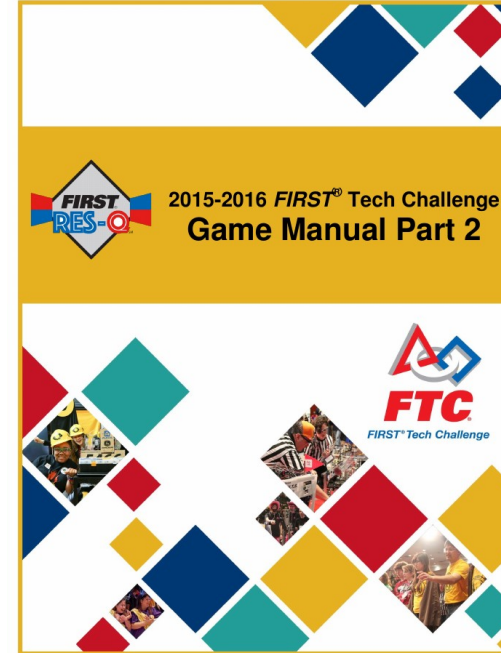
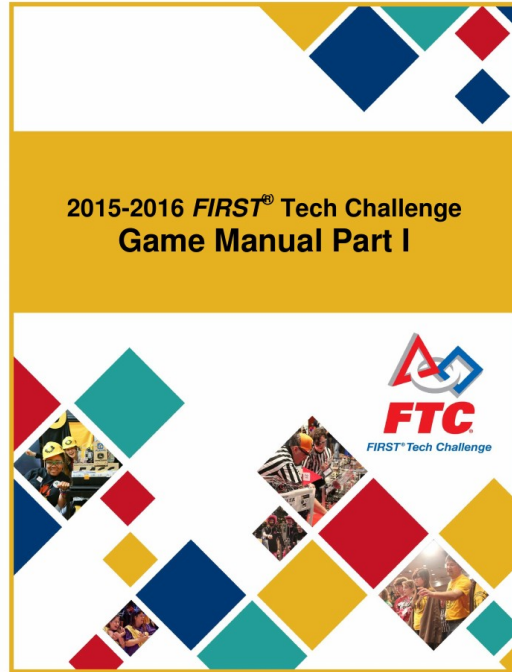
- Engineering Notebook judging

League Tournament event

- Teams seeded into elimination rounds based on league meet results

- Judging

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 → Super-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 TETRIX