FIRST Robotics Introduction for Mentors

St. Joseph's Collegiate Institute

What is FIRST?

FIRST's goal is to inspire young people to be science and technology leaders and innovators.

- Acronym: ***F**or **I**nspiration & **R**ecognition of **S**cience & **T**echnology*
- Focus on **Coopertition** and **Gracious Professionalism**
- Founded by Dean Kamen and Woodie Flowers in 1989
- 3,900+ teams with ~97,000 students from around the world
- **$80 million in scholarships** (!!!) across 3,000+ opportunities

What is FIRST?

> **FIRST is more than robots.** The robots are a vehicle for students to learn important life skills. Kids often come in not knowing what to expect – of the program nor of themselves. They leave, even after the first season, with a **vision**, with **confidence**, and with a sense that **they can create their own future.**

Co-Founder Dean Kamen

Gracious Professionalism

- **Knowledge**, **competition**, and **empathy**
  - Encourage high-quality work from students
  - Emphasize the value of others
  - Teach respect for individuals and the community

> “Gracious professionals learn and compete like crazy, but treat one another with respect and kindness in the process.”
>
> Co-Founder Woodie Flowers

Coopertition

Cooperation + Competition = Coopertition

- Cooperation produces innovation
  - Displaying **unqualified kindness** and **respect** in the face of fierce competition
  - Teams can and should **help** and **cooperate** with each other even as they compete

Team Mentality will always produce better results!

So What About the Robots?

A Yearly Competition

- Every year, a new game is announced that every team will try to tackle and come up with a solution to solve
  - 2019's game was *FIRST Deep Space*, where teams competed to outpace their opponents to place Hatch Panels & Cargo balls into the appropriate areas

A Yearly Competition

Teams are tasked with building a robot that overcomes the game's challenges through inovative solutions

Most years have two modes; **autonomous** & **teleoperated**

- Robots are autonomous and drive on their own for the first 15 seconds of the match to score bonus points
- A human driver controls the robot for the remaining match time using teleoperated controls, like an Xbox controller

These robots are no slouches or little toys though

FRC Robotics Overview

We compete in FRC, the highest level of FIRST competition

- 120lb robot maximum weight
- Multiple subsystems
  - Lifts, elevators, climbers, ball shooters, & more
  - Powerful motors
  - Speeds of up to 10mt/s (22 mph)
  - Pneumatics (air pistons and valves)

What Does It Take to Build a Robot?

Robots are complicated machines that require teamwork to design, build, and perform

- Multi-disciplinary collaboration
  - Mechanical design & prototyping
  - Electrical systems
  - Manufacturing & fabrication
  - Software programming
  - And much more!

The team has 6-10 weeks to go from an idea to a fully operational robot to compete in the local competitions

More Than Just Engineering

A robotics team takes more than just engineering. It requires individuals interested in many different non-STEM fields as well

- Public relations
  - Artwork
  - Brand design
  - Sponsorship & donation outreach
- Finance & budget management
- Competition scouting

What's the Timeline Look Like?

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There are four major "time blocks" for a FIRST robotics team

- The **Build Season** runs from January to the end of February
- **Competition Season** runs from March and April
- The **Preseason** runs from September (now!) through December, up until the Build Season starts
- The offseason runs from the end of Competition Season into the fall when the Preseason begins

The Preseason

The preseason is used to prepare the team for the upcoming season

- Timeline: September thru December
- Duties:
  - Recruit new members
  - (Re)train on safety, machinery, and processes
  - Refresh business & art material
  - Fundraise as needed

The Build Season

The build season is when the game is revealed, and the team designs & builds a robot to overcome the given challenges

- Timeline: January & February (potentially early March)
- Duties:
  - Understand the game rules
  - Envision robot subsystems
  - Design CAD models, build, & assemble components
  - Drive training on a practice field

The Competition Season

The competition season is when we travel to a regional event to compete against other teams in 3 vs 3 alliances over a weekend

- Timeline: March & April
- Duties:
  - Drive the robot
  - Scout other teams for match strategy
  - Inspect & repair the robot as needed
  - Submit & present for team & individual awards

The Competition Season (cont)

Our team's usual regional is hosted at the Rochester Institute of Technology (R.I.T.). We bring a mini-bus & a subset of the team (~15 people) to partake in the weekend-long event.

Teams that win regionals - or special awards - are invited to the **World Championships**, where they compete against the best-of-the best FRC teams in the world.

Pending budget, team size, and robot completion, the team *may* attend a second regional event, but that is unknown at this time.

Why Are Mentors Needed?

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Mentors across different disciplines are there to guide students to ask questions, discover, and grow.

- Promote a safe environment of learning & communication
- Promote **Coopertition** and **Gracious Professionalism**
- Keep expectations realistic & deadlines achievable
- *Guide students (& other mentors) to be their best!*

What Do You Need to Do to Mentor?

Each mentor's committment is dependent on their life outside the team. Give what you can, and it is always appreciated

- Attend team meetings in a periodic manner
- Be open & transparent with students & other mentors
- Be *at least* one step ahead of the students where possible
- Practice the best safety & teamwork principles

You don't need to know *any* about robotics to mentor a team!
You don't even have to work on the robot if you don't want

What Do You Get for Mentoring?

- Knowledge & experience across many different disciplines
- The space to get creative; whether through design, building, or art
- A vast network of engineers, leaders, managers, and smart students from around the region/state/country/world!
- The ability to positively influence the student team members

> “ Participating in & mentoring an FRC team is one of the most rewarding experiences I've had in my life. I credit where I am in life due to FIRST.
>
> Dan Starner ”

What's Next for a Perspective Mentor?

1. Give us your contact information!
2. Decide what areas & tasks interest you the most
3. E-sign the forms needed by FIRST to work with the students
4. Attend & shadow your first meeting with the team
5. Bring a good attitude & willingness to learn!

As you foster a relationship with the team, your roles, responsibilities, & committment will evolve into what you envision for yourself.

Thanks for listening!

Any Questions?