



2021-2022 NC FIRST TECH CHALLENGE KICK-OFF

Saturday, September 18, 2021

SCHEDULE

8:30am - Team Check-in

9:00am - Welcome (Auditorium, A/B/C/D)

9:30am - Workshops - Session 1 (Auditorium/A/B/C/D, 130, 131, 132) **40-minute sessions.*

10:15am - Workshops - Session 2 (Auditorium/A/B/C/D, 130, 131, 132) **40-minute sessions.*

11:00am - Workshops - Session 3 (Auditorium/A/B/C/D, 130, 131, 132) **40-minute sessions.*

11:40am - Lunch Break

12:00pm - FIRST Live Stream begins (Auditorium/A/B/C/D, 130, 131, 132)

1:00pm - Game Q&A and Game Field Access (Auditorium, A/B/C/D, Pre-Function 185, 186, 187)

3:30pm - End of Kick-off Event

**Note: All sessions will be live-streamed/recorded.*

**Participants are asked to attend the sessions noted in their online registration form.*

All in-person attendees are **REQUIRED to wear a mask.*



Transportation drives us forward – impacting economies, bridging cultures, and making us all more globally interconnected. *FIRST®* Tech Challenge teams will race against time to transport hard-to-move essential goods as they explore the future of transporting relief to those in need in **2021-2022** **FREIGHT FRENZY** presented by **Raytheon Technologies.**

WORKSHOP SESSION LIST

Room #	Time	Team #	Team Name	Title
A	9:30 AM	2901	Purple Gears	Introduction to On-Shape
A	10:15 AM	2901	Purple Gears	FTC Parts Library
A	11:00 AM	16461	Infinite Turtles	Intro to CAD (Rendering)
B	9:30 AM	8569 & 6078	Roboknights and Cut the Red Wire	Outreach
B	10:15 AM	16072	Quantum Quacks	Creating Videos
B	11:00 AM	19376	Thermal Equilibrium	Next Steps in Mechanical Concepts
C	9:30 AM	5064 & 16461	Aperture Science and Infinite Turtles	Developing a Design Process
C	10:15 AM	5064	Aperture Science	Dead Wheel Odometry
C	11:00 AM	5064	Aperture Science	Linear Motion
D	9:30 AM	731 & 16072	Wannabe Strange and Quantum Quacks	Marketing & Branding
D	10:15 AM	16461	Infinite Turtles	3D Printing
D	11:00 AM	16072	Quantum Quacks	Inspection
130	9:30 AM	19376	Thermal Equilibrium	Control Theory
130	10:15 AM	19376	Thermal Equilibrium	Advanced Control Theory
130	11:00 AM	16072	Quantum Quacks	Driver Hub, Materials and Control Systems
131	9:30 AM	6078	Cut the Red Wire	Autonomous Programming
131	10:15 AM	19376	Thermal Equilibrium	Scoring Mechanisms
131	11:00 AM	731	Wannabee Strange	Drivetrains
132	9:30 AM	16072, 11528 & 19376	Quantum Quacks, Bots of Prey and Thermal Equilibrium	Portfolio

132	10:15 AM	Fiona Last-Powell & 16072	Head State Judge Advisor and Quantum Quacks	Progression of Programs
132	11:00 AM	Fiona Last-Powell	Head State Judge Advisor	Judging 101
AUDITORIUM	9:30 AM	Sharpe Pursuits	NC FTC Event Planner	Registration
AUDITORIUM	10:15 AM	14200	Wasp 12-B	Rookie Teams
AUDITORIUM	11:00 AM	2901	Purple Gears	Intro to Android Studio

Session Descriptions

9:30am Session 1

ROOM A

Introduction to On-Shape

Team 2901 Purple Gears

This session is focused on an introduction to the CAD program Onshape. It will range from setting up an account to modeling a pushbot with parts from the vendor Pitsco. In this session, we will explore assemblies and how to use the various types of mates Onshape provides to model a completely functioning drive base. By the end of this session, you will have a sample pushbot drive base and the skills to get a start on expanding beyond that robot!

ROOM B

Outreach

8569 Roboknights and 6078 Cut the Red Wire

What is FTC Outreach? Why is it important? How do you get involved with it? Join these two experienced teams to learn about the outreach they do.

ROOM C

Developing a Design Process

5064 Aperture Science and 16461 Infinite Turtles

This presentation will go over the benefits of a set team design process and how teams can develop a procedure to maximize their in-season design productivity. (Collaboration between 5064 and 16461 since it didn't let me put in two team numbers, Timothy from 5064 and Davy from 16461)

ROOM D

Marketing & Branding

731 Wannabe Strange and 116072 Quantum Quacks

Marketing is all about creating connections within the community, reaching out to sponsors, finding new team members/mentors, and more. In this presentation, learn how to solidify your team's image through social media, websites, and other media such as flyers and banners. We will talk about how important branding is in FTC and then go through some practical tips and tricks to make logos easier to use and learn about some design principles and popular softwares when creating media for outreach events and competitions.

ROOM 130

Control Theory

19376 Thermal Equilibrium

Introduce the concepts of open loop and closed loop control -introduce PID Control -introduce Feedforward Control - provide examples of both being used on the competition field and how each controller was designed

ROOM 131

Autonomous Programming

6078 Cut the Red Wire

Sensor input is very important in autonomous, and some use cases are odometry and cameras. You can use these to detect other objects and stay in the correct position throughout autonomous. The motors of the robot can either be controlled via a programmed set of instructions or can re-route themselves based off of sensor input. The second method is more advanced but leads to a better performance especially when other robots are involved. Join 3 Cut the Red Wire (FTC team # 6078) programmers to learn more about autonomous programming.

ROOM 132

Portfolio

16072 Quantum Quacks, 11528 Bots of Prey and 19376 Thermal Equilibrium

How to make a more competitive portfolio? What information should be included in the portfolio? How to best use illustrations to format information while enhancing the aesthetic appeal? Including Graphs, Pictures, CAD Models, Tables and More. This session will cover the basics of what the rules are and talk about some strategies that have had success in the past.

AUDITORIUM

Registration

Sharpe Pursuits (FLL & FTC State Event Planner)

This session will go over the platform we will use this season as well as how teams should register for tournaments and how information will be communicated to teams.

10:15am Session 2

ROOM A

FTC Parts Library

Team 2901 Purple Gears

Using the FTC Parts Library with Onshape will go over how to integrate the FTC Parts Library into your team's everyday Onshape use. Through the presentation, we will be assembling a basic Pushbot while explaining how to use and animate basic parts, configurables, and assemblies. Additionally we will show how to properly modify a part from the library.

ROOM B

Creating Videos

16072 Quantum Quacks

In this presentation we will talk about how to plan, shoot, and edit a video for FTC. We will also talk about the rules for promote and compass.

ROOM C

Dead Wheel Odometry

5064 Aperture Science

Through the use of a slideshow presentation as well as a live demonstration with our gobilda strafe chassis and three 60 mm omni-wheel dead wheel odometry set up we will explain and showcase: - What odometry is (in general) - Why odometry is useful - What dead wheel odometry is - How to build dead wheel odometry with dead omni wheels - What measurements to take after building odometry - Basic math behind odometry - Basic code implementation of odometry math and measurements

ROOM D

3D Printing

16461 Infinite Turtles

This class will go over the details of how to utilize 3D printing effectively for FTC, from where to use parts to how to print them.

ROOM 130

Advanced Control Theory

19376 Thermal Equilibrium

This presentation will detail advanced control theory topics such as improvements to the traditional PID controller, motion profiling for trajectory generation, and more advanced feedforward control methods. This presentation will also discuss

how mathematical models of systems can assess stability and performance before one needs to implement it on a real robot.

ROOM 131

Scoring Mechanisms

19376 Thermal Equilibrium

Join #19376 Thermal Equilibrium (Kate Hicks) and #5064 Aperture Science (Timothy Felten) to take a look at scoring mechanisms used in previous seasons. We will discuss common concepts used in FTC mechanisms as well as design strategies to use to make a successful scoring mechanism.

ROOM 132

Progression of Programs

Fiona Last-Powell and 16072 Quantum Quacks

FLL to FTC similarities and differences. FTC to FRC why a student may not choose to move up.

AUDITORIUM

Rookie Teams

14200 Wasp 12-B

This is a basic overview of everything we wish we would have known in our rookie year. We will also have a question/answer session to help answer any remaining questions the rookie teams may have. We will talk about rookie resources, the importance of engineering books, notes, and saving money.

11:00am Session 3

ROOM A

Intro to CAD (Rendering)

16461 Infinite Turtles

An introduction to rendering robot CAD realistically using Blender.

ROOM B

Next Steps in Mechanical Concepts

19376 Thermal Equilibrium

Learn about different motion types, how virtual four bars work, different ways to string lifts and other mechanical concepts that will help you build your FTC robot.

ROOM C

Linear Motion

5064 Aperture Science

Explaining types and modes of linear motion with examples for FTC.

ROOM D

Inspection

16072 Quantum Quacks

Walking through a robot inspection and talking about what each item means

ROOM 130**Driver Hub, Materials and Control Systems**

16072 Quantum Quacks

We will go over the features of the driver hub and talk about the upsides and downsides to switching.

ROOM 131**Drivetrains**

731 Wannabe Strange

Drivetrains are the basis for all FTC robots, so choosing the type of drivetrain to use is important. This presentation details the pros and cons of the main drivetrains used in FTC such as mecanum, tank, x-drive, and more. There will also be info about gear ratios, drivetrain kits, as well as other cool and interesting drivetrains.

ROOM 132**Judging 101**

Fiona Last-Powell (Head State Judge Advisor)

Join the Regional Lead Judge Advisor for a comprehensive analysis of the current FTC Judging rules and how to effectively communicate them remotely for the Interview and in person for the pit visit.

AUDITORIUM**Intro to Android Studio**

2901 Purple Gears

In this session we will you with the basics of programming a robot. This includes getting set up with Android studio and Git for collaborative programming, downloading the FTC codebase, and writing a simple TeleOp program to get your robot running.