CHS FIRST ROBOTICS

STUDENT HANDBOOK

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1. Welcome

Welcome to the CHS First Robotics Team, Team 3556 GET SMART. If you are now a part of the team, you have been identified as an intelligent, capable, and self-motivated student that has shown interest in the fields of science and engineering. This handbook will be your introduction into the world of FIRST Robotics and will assist in you in learning the basics as well as helping you find your place on the team.

Take time to read everything as it has all been documented for your benefit. Please don't hesitate to ask one of the mentors or a veteran to clarify a topic or an issue that isn't covered in this guide. Keep this document handy for future reference and once again, congratulations on making the team.

2. Mission Statement

We are the Columbia High School FIRST Robotics team. We build robots through the application of the engineering-design process to compete in the FIRST Robotics competition each year. Our goal is to inspire an appreciation in mathematics and science technologies in mentors and students alike. We also strive to instill a sense of teamwork and professionalism as well as help students develop interests for their future.

3. History

Team 3556 GET SMART has a pretty unique beginning amongst other FIRST teams. What initially started out as the classroom project of Columbia High School's Physics class turned out to be bigger and better than any of us would have expected. In 2011, Columbia High School applied for a grant from jcpenney for the FIRST Robotics competition. Halfway through the school year Mrs. Crews, the new Physics teacher, was chosen to take on the FIRST Robotics competition with her Physics class becoming the team. In January of 2011, with a few more students recruited from the other science classes as well as some teachers and mentors, we made our three hour journey to Orlando for the FIRST Kickoff.

At Kickoff, we were blown away from all that was thrown at us. We had no idea that this competition would be so grand. However, even though we had no clue what we were headed for, we decided that we would give it our all to learn from this amazing experience before us. Thus, a ragtag group of quickly assembled students and adults from a small town became the CHS FIRST Robotics Team 3556 GET SMART.

And so the 6 weeks of madness began. The sleepless nights where coffee was our only friend, the rushed fundraisers in order to acquire a necessary part, and the utter chaos that transpires when a rookie team tries to build a working robot – we experienced it all. We overcame many obstacles together as a team. Lacking technology and resources, we struggled to overcome our difficulties as a team in a rural town. It was our unyielding determination and drive to do our best that allowed us to survive build season intact. Our mentor team, FIRST Robotics Team 86 Resistance graciously provided us guidance and support in our rookie year.

Team 3556 GET SMART was excited for last year's game Rebound Rumble, a basketball based game that involved picking up and shooting balls through hoops for points. As a team, we strive to make each year better than the last and we really accomplished that in our 2011-2012 season. We had a lot of success with that year's robot, Maxwell. He could pick up as well as shoot balls and had a well coded autonomous that allowed Maxwell to score many points even before the game began. At the FIRST Florida Regional, Team 3556 was picked as a member of the first seeded alliance by Team 180 SPAM alongside Team 744 Shark Attack. Our alliance placed second amongst 64 teams, an impressive feat for a second year team.

The FIRST Robotics Competition allows us to expand our love for science and technology and help many of our students reach their dreams of pursuing a job in the science and engineering fields as well as business and marketing. Team 3556 hopes that FIRST Robotics will continue to instill a sense of purpose and inspire an appreciation for science and technology in young minds.

4. Calendar

4.1 Important Dates/Deadlines

STIMS Opens 8/2/12

TIMS Opens 6/28/12

FIRST Regional Event Registration 9/27/12 – 12/6/12

2nd Regional Registration 10/25/12 – 12/6/12

FIRST Championship Registration 10/25/12 – 12/6/12

Initial Registration Payment due 12/7/12

Team Profile Loads 12/20/12

Judges Information Loads 2/20/12

Kickoff Registration 10/4/12 – 12/6/12

Kickoff 1/5/13

Kit of Parts (filing missing parts complaints) 1/7/13 – 1/11/13

KOP Drive System option TIMS 10/1/12 – 10/18/12

Stop Build 2/19/13

FIRST Deans List Award 11/8/12 – 2/21/13

Chairman's Award 11/8/12 – 2/21/13

Woodie Flowers Award 11/8/12 – 2/21/13

Entrepreneurship Award 11/8/12 – 2/21/13

Website Award 11/10 – 2/16

Safety Animation Submissions 10/11/12 – 12/13/12

Florida Regional 3/7/13 – 3/10/13

4.2 Pre-Kickoff Activities

Before kickoff, the main focus of the team is fundraising as well as recruiting and training new members.

4.3 Build Season

Kickoff signals the start of build season which is the most crucial and hectic time of the year for FIRST teams. It is where the current year's competition will be revealed to all FIRST teams at once. It is followed immediately after by a brainstorming session with our mentor, Team 86 Resistance. Afterwards, team members will break off into sub-teams to present their ideas for the current year's robot. The most efficient parts of each design will be chosen and the robots final design will be decided within the first week. The following weeks will be spent building, wiring, and programming the robot.

The Florida Regional competition is held at the main campus of the University of Central Florida in Orlando. The travel team will be chosen based on available funds and student eligibility. Other factors that will be given consideration while determining spots include maturity, involvement, and sponsorships. Everyone works hard to be on the travel team, going to a FIRST Regional is an experience of a lifetime.

5. Organization

One of the most important parts of being on a team is finding where you fit in. Listed here are short summaries of the available roles on the team to help you determine where you think you would fit. Keep in mind that being a part of a certain sub-team doesn't limit you to learning about or being a part of what another sub-team does. Being a part of a FIRST Team is a learning experience for everyone, so don't be afraid to learn something new.

Our team structure is built upon succession, with upperclassmen getting most of the leadership roles so that they may teach underclassmen and new members how to handle affairs before they graduate. Unlisted are the positions of Junior Team Captain and Senior Team Captain whose roles encompass aspects from all the sub-teams.

5.1 Safety – 2 members

The senior and junior team captains also fulfill the role of safety captains whose role is to help everyone to adhere to the standards of safety set forth by FIRST, reminding members to wear safety glasses while working in the build room, and reprimanding those who are being unsafe. Remember, following safe procedures is for ***everyone's*** safety, not just yours.

5.2 CAD (Computer Aided Design) – 6 members

The CAD captain and their team will be in charge of using AutoCAD to design the robot online before it is actually built. Experience in CAD will give you a competitive edge when applying for colleges as well as the work world.

5.3 Programming – 4 members

The Programming Captain and their team will be in charge of using LabVIEW to program the functionality of the robot. LabVIEW is the programming language that members will train to be proficient in to work together and build a working code for the robot.

5.4 Media/Website – 4 members

The Media Captain and their team are in charge of documenting team events through picture and video. They are tasked with putting together videos for awards, recruitment, and achievements. The media team is also responsible for team branding through shirts, graphics, and team paraphernalia.

They are also in charge of GET SMART's website, team3556.com. They will update the website on the team's status and post about current events pertaining to the team or FIRST. The website team is also in charge of the Team 3556's member forums.

5.5 Build/Electrical – 7 members

The Build Captain and their team are in charge of constructing the robot during build season. Their duty is to make a structurally sound and effective robot based on the design brainstormed by the team and laid out by the CAD team. The electrical sub-team is in charge of wiring the robots, placing motors, and making sure they work. They will be working closely with the CAD, build, and programming teams.

During build season, the build team is subject to being divided into specialized groups according to the needs of the robot. The build team is also in charge of the cleanup schedule that sets who will stay behind on which days during build season to help clean up, a requirement that needs to be met to make the travel team.

5.6 Management – 4 members

The Management Captain and their team are in charge of essay writing, thank-you letters, sponsorship packets, and team structure. They are the information center of the team and are tasked with keeping everyone up to date on team activities.

They are also in charge of fundraising by keeping team quotas of how much money everyone has raised. They also handle counting the money earned through fundraisers and collaborate with the head mentor who is in charge of finances.

5.7 Bumpers – 3 members

The bumper team is an all rookie team led by a mentor who will coach the new team members on bumper making guidelines. This will give them a chance to learn how to make an important part of the robot and practice teamwork as well as following procedures.

6.1 New Members Guide

6.1 Code of Conduct

Repeated offenses or refusal to adhere to the code of conduct will lead to probation or expulsion from the team accordingly.

1. R-E-S-P-E-C-T, it means a lot to everybody.

All team members are expected to be respectful of each other. There can be a lot of tension during build season since you might be working closely with someone you may not be on the best terms with but you must put your differences aside for the good of the team. Everyone generally gets along and we all have a lot of fun together. Respect your mentors, respect your captains, and respect each other.

2. Be mindful of your position.

Please keep in mind that when you are a member of CHS FIRST Robotics Team 3556 GET SMART, you are representing the team, CHS, and FIRST. Don't engage in activity that may tarnish our reputation or yours.

If you see or hear another member not exhibiting the gracious professionalism as expected from a member of the team and FIRST, don't hesitate to report it using the anonymous comment box. You are doing the team justice by reporting such incidents.

3. No horseplay around power tools.

DO NOT PLAY AROUND WITH THE EQUIPMENT. USE TOOLS FOR THEIR INTENDED PURPOSES ONLY AND PRACTICE SAFE PROCEDURES AT ALL TIMES. These rules are put in place to keep you in one piece and breaking them will subject you to the wrath of the safety captain and possible expulsion from the team. Treat the team equipment BETTER than if it was your own personal property, we don't have a lot, let's keep what we do have in working order.

6.2 Travel Team Criteria

To be chosen for the travel team, you must display dedication and effort to the team. Being present at most build sessions and being active in team activities plays a key role in being chosen. There is also certain requirements that must be filled, you must have been part of the cleanup crew in at least 4 build sessions, attended at least 6 team fundraisers, and have raised or attempted to raise $500 for the team. The last task may seem daunting but there are several months and many opportunities to do this.

6.3 General Tips

Having a USB really helps with file and document sharing and so does having a laptop. Neither are required but they are especially helpful when you're on a sub-team that requires a lot of information exchanging, CAD, Media, Programming, Website.

7. Build Season

Kickoff signals the start of build season, it is immediately followed by a strategy session with our mentor Team 86 Resistance. The Monday after, there will be a mandatory team meeting where parents are invited to watch the game animation and the year's calendar is opened up for members and parents to sign up for catering and clean-up duties. Every member is required to bring their own pair of safety glasses, measuring device (ruler, measuring tape, etc.), and pencil when they come to a build session.

7.1 Build Sessions

Build sessions are immediately after school on purple days and 5:30 on gold days. Build sessions end latest at 10:00. Members are required to sign up for clean-up duty for at least 4 build sessions, and shop organizing for at least 2 sessions. Clean up duty involves cleaning up the actual classroom and is done at the end of each build session, shop organizing involves organizing the shop twice a week on Wednesdays and Saturdays. Members are encouraged to sign up for catering duty if they can; feeding teenagers is a daunting task.

7.2 Competition

We attend the FIRST Florida regional held in the University of Central Florida Arena. The travel team is chosen by the mentors based on dedication, behavior, maturity, and fulfilled criteria. If you are not chosen for the travel team, you may attend competition anyways on your own ticket. If you were not chosen due to behavioral issues and are on probation, you can still attend but with no association to Team 3556.

The build team will be spending most of their time in the pits performing maintenance on the robot.

A veteran representative of the programming team will check into the pits after every game to check on the status of the code.

Everyone else will be part of the spirit team, cheering in the stands.

8. Team Communications

Being a part of the team, you will be invited to the team DropBox, which is public file sharing throughout several devices, extremely useful.

Team 3556 has a closed Facebook group you will be invited to if you have one. If you don't, it's highly recommended you get one because of how much information is posted through Facebook, pictures, events, etc.

Our website is team3556.com, learn it, love it, and post on the forums.

Another you should acquaint yourself with is usfirst.org, the FIRST website which is a valuable resource to anyone and everyone.

Make sure you pass on your email, phone number, and contact information to a management team member or the head mentor to put in the system.

9. Programming Resources

What is programming?

Programming is a way of relaying knowledge, ideas, and actions through the form of code from a computer to a device (i.e. a robot). Programming can be text based or visual based; on the team we use a visual based application called LabVIEW.

What is LabVIEW?

A programming application designed by National Instruments; it is the programming language we use on the team.

What are some components to LabVIEW?

There are many different components to coding in LabVIEW, and it can get really complex; however, there are a few small recurring parts of code that act as the building blocks for the rest of the code. They are:

Loops- A loop is a structure in the language that reiterates a certain portion of code a given number of times or until a certain condition is met.

Structures- A structure will allows us to change between different situations without redeploying code. It allows us to use different buttons.

Controls- Controls are what they sound like, they offer control. They are user inputs.

Indicators- An indicator can be added in the code so the user can get visual feedback for their code.

Constants- A constant is usually a numeric number that will only run a motor control at a fixed number. 5 will always be 5; it can never be 4 or 6.

Global Variables- A global variable is a way for code to communicate between VI's. It allows us to communicate between the dashboard and the robot.

Booleans- A data type that only has two values: True and False. It allows us to differentiate between situations.

Where can I learn more information about LabVIEW?

Here is a list of references for LabVIEW:

Tutorials:

The LabVIEW Wiki:

http://labviewwiki.org/LabVIEW

And never be afraid to ask a question on Chief Delphi:

http://www.chiefdelphi.com/forums/forumdisplay.php?f=182

9.1 The 1010 Commandments

A programmer should be very self-driven and be able to work long hours on code at team meetings as well as at home.

A programmer should be able to walk one of the senior programmer's (Chandler or Elijah) through the 2012 Competition Code (Specifically Begin, Teleop, and Finish VI's) by the first day of build season (January 5th, 2013).

A programmer needs to be able to keep a level head in stressful situations, needs to not be offended easily, and be able to work well with the rest of the programming team.

A programmer needs to know how to back up and store code on any flash drive, and know where the working code is at all times, as well as understand the naming convention set forth by the team.

A programmer needs to consult the Programming Captain before deploying any code; if the Programming Captain is not present, they need to consult the Senior Programmer.

A programmer needs to know which code is currently on the robot at all times.

A programmer needs to know the basics of the wiring of the robot and be able to work very closely with the electrical team.

A programmer needs to configure the joysticks and controls of the robot to the driver’s specifications, and be able to clearly relay those controls in a simple way.

A programmer may NOT rewrite working code without permission.

A programmer needs to set their ego aside for the betterment of the team and the robot. As a programmer, you will make mistakes, accept it when you do.