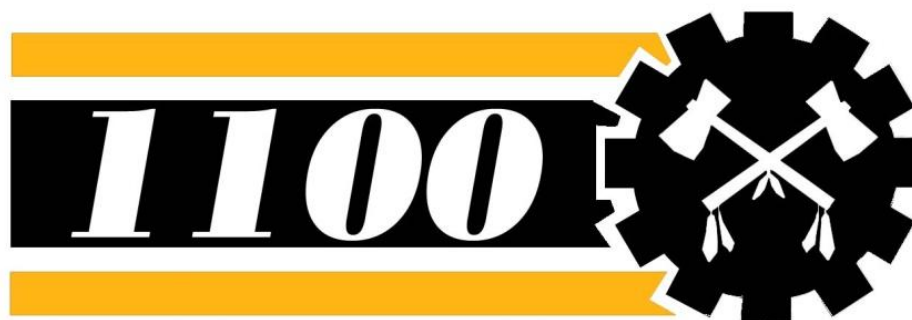




**For Inspiration and Recognition of Science
and Technology**



Team 1100
The T-Hawks

Team Handbook
2018-2019 Season

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Section 1: Introduction

Welcome to the 2018-2019 Season of FIRST Team 1100! This Handbook and associated documents are intended to serve as a guide during this year, providing an understanding of (1) the program, (2) your opportunities on the team and, (3) responsibilities as a participant. In the following pages is all of the information necessary to have a fantastic season. If you still have questions, feel free to contact a team mentor or co-captain.

About FIRST®

FIRST (For Inspiration and Recognition of Science and Technology) was founded in 1989 to inspire young people's interest and participation in science and technology. Based in Manchester, NH, the 501(c)(3) not-for-profit public charity designs accessible, innovative programs that motivate young people to pursue education and career opportunities in science, technology, engineering, and, math, while building self-confidence, knowledge, and, life skills.

Mission

“The mission of FIRST is to inspire young people to be science and technology leaders and innovators, by engaging them in exciting Mentor-based programs that build science, engineering, and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication, and leadership.”

FIRST is More Than Robots. FIRST participation is proven to encourage students to pursue education and careers in STEM-related fields, inspire them to become leaders and innovators, and enhance their 21st century work-life skills.

This worldwide organization strives to inspire students of all ages, and thus has age appropriate programs that challenge students ages 6-18. FIRST LEGO League Jr. (FLL Jr.) and FIRST LEGO League (FLL) challenge grade-school students to build out of LEGOs and create a solution to a real-world problem. FIRST Tech Challenge (FTC), designed for students in grade 7-12, releases a new game each year that teams compete in with a robot 18” X 18” X 18”. Team 1100 is part of the FIRST Robotics Competition (FRC) program, which targets students in grades 9-12. Each year, FRC teams build a 120 lb. robot to compete in alliances of three.

FIRST also has two values that permeate competitions across all four levels: Gracious Professionalism and Coopertition. FIRST has provided the following descriptions for these values.

Gracious Professionalism

Gracious Professionalism is part of the ethos of FIRST. It's a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community.

With Gracious Professionalism, fierce competition and mutual gain are not separate notions. Gracious professionals learn and compete like crazy, but treat one another with respect and kindness in the process. They avoid treating anyone like losers. No chest thumping tough talk, but no sticky-sweet platitudes either. Knowledge, competition, and empathy are comfortably blended.

In the long run, Gracious Professionalism is part of pursuing a meaningful life. One can add to society and enjoy the satisfaction of knowing one has acted with integrity and sensitivity.

Coopertition

Coopertition® produces innovation. At FIRST, Coopertition is displaying unqualified kindness and respect in the face of fierce competition. Coopertition is founded on the concept and a philosophy that teams can and should help and cooperate with each other even as they compete.

Coopertition involves learning from teammates. It is teaching teammates. It is learning from Mentors. And it is managing and being managed. Coopertition means competing always, but assisting and enabling others when you can.

About Team 1100

Team 1100, the T-Hawks, from Algonquin Regional High School in Northboro, MA provides an opportunity for students to work side by side with professional engineers, scientists, and mechanics to learn technical and problem solving skills. Mentors act as facilitators by introducing and demonstrating new techniques that complement the student's experience.

A key foundation of Team 1100 is Gracious Professionalism (GP). GP stands for sportsmanship above and beyond the normal. GP means being as supportive to the students and mentors on other teams as we are to our own. We want ALL students to be inspired by what we can do. GP does not demand that our kindness be returned before we decide to give ours. Years from now our team alumni will remember a great play, some adversity overcome, helping out another team in need, but not so much the plastic trophies collecting dust in a school display case. We hope that alumni from other teams remember our members as well: for helping them get a robot running, as good sports, and fun to be with. A major part of demonstrating GP is to show respect at all times for all teammates, mentors, parents, other teams, sponsors and volunteers.

2003 was the rookie year for Team 1100 in FIRST. The team was started when veteran mentors Bob Galgano and Gerry Wolfe from Team 105 (Bay Path Regional Vocational Tech.) offered their expertise, time and sponsor money from their companies to the head of the Technology department at Algonquin, Goven Baird, after Team 105 decided not to continue their FIRST robotics team. Joining Bob and Gerry in leading the team was Dan Strickland. The team started with a small group of students, but completed the first robot on time and competed in "Stack Attack" at the Hartford, CT Regional.

The team is now in its 17th year. The team has students from Algonquin, and other surrounding towns which currently do not have FIRST teams, as well as from area private schools without teams, and home-schooled students. The team helps develop interest in robotics at the middle school level through mentoring FIRST LEGO League teams. With the help of the dedicated advisors, mentors and parents, Team1100 continues to offer a unique opportunity to the students in and around Algonquin Regional High School.

Team 1100 Mission Statement

*Through participation in the annual FIRST Robotics Competition, local university VEX robotic competitions, support of local FIRST LEGO League teams, and multiple community outreach activities, **FIRST Team 1100** inspires young people from Algonquin Regional High School and surrounding communities to be science and technology leaders. We accomplish this by engaging them in challenging mentor-guided programs that build science, engineering and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication, and leadership.*

Section 2: Team Structure

FRC brings a unique experience to students. A different way of involving students - not by just playing with robots in an after-school club but working in a true engineering environment with and alongside professional engineers and scientists. This is not your typical teacher/student interaction!

Team 1100 has an approach that involves ALL team participants – students, mentors, parents, and sponsors give all they can, and everyone has ownership. Students develop an appreciation for engineering by working hands-on side-by-side with professional engineers. All hands are on the robot together, and all ideas are heard and debated as a team.

Team 1100 is run through the combined efforts of students and mentors working together. Team 1100 cannot be considered as either an exclusively student-run team or an exclusively mentor-run team. It is a team run by *both* students *and* mentors collaborating. It is noted that certain functions on the team are required to be completed by adult mentors – for example paying the team's registration fees in TIMS or ordering buses from the school for trips. Other functions on the team are required to be completed by students - such as driving and operating the robot in competition matches. However, the team can only be successful if the general operation and running of the team is done through strong cooperation between students and mentors.

Make no mistake that the *purpose* of FIRST, and Team 1100, is to benefit the students. The Team 1100 mentor guidelines clearly state that the role of team mentors is to enhance the students' experience. Providing students the opportunity to lead and run team functions is a big part of that experience.

Nearly all aspects of the team's activities during the year are up for discussion in our practice of shared leadership. During the brainstorming sessions after Kickoff, for example, students and mentors will split into small groups to develop, then defend before the team, alternative design approaches. Overriding concerns such as risk, cost, detailed design time, machining capabilities, labor, skill required, etc. are given consideration in coming to a final decision. After gathering input from team members, it is up to the team leaders, including the student and mentor Sub-Team Leaders, student Co-Captains, and Lead Mentors, to make decisions commensurate with their leadership roles to move the team forward.

Team Leaders

Team 1100 leadership is provided by two Lead Mentors, two Student Co-Captains, six Student Sub-Team Leaders, and up to six Mentor Sub-Team Leaders

Lead Mentors

For the 2018-2019 season, the Lead Mentors are Dan Strickland and Bob Galgano. Dan Strickland is also the ARHS faculty adviser for the team.

Student Co-Captains

Team 1100 has two student Co-Captains who are tasked with leading the entire team. They ensure that the team is on track to meet its goals, want to hear to every student's thoughts, facilitate team meetings and communications, and put extra effort into helping the team succeed. Team captains are chosen by the Lead Mentors in the spring via an application and interview, in addition to team input. Any interested student may apply.

Executive Board

The Executive Board for the team consists of the two Lead Mentors, and the two Student Co-Captains. The Executive Board holds regular, brief meetings, usually once per week, to review and plan for the team. These meetings are typically call-in or online meetings during weeknights.

Sub-Teams

Team 1100 is organized into six sub-teams, including the following:

- Mechanical Engineering and Design
- Electrical Engineering and Controls
- Manufacturing
- Strategy and Operations
- Recognition and Awards
- Outreach and Sponsor Integration

Each Sub-Team is led by one student and one mentor, working together. In the event the team does not have enough mentors to fill all six roles, some mentors may hold dual roles (for example, a Lead Mentor may also be the Mentor for the Mechanical Engineering and Design Sub-Team, etc.)

Sub-Team Leader Meetings

Meetings of the Sub-Team Leaders are held bi-weekly, typically one hour before a regularly scheduled team meeting. The Lead Mentors, working with the two Student Co-Captains, prepare and issue a meeting invitation, and an agenda, before the meeting. The business of the meeting is conducted by the Student Co-Captains working with the Lead Mentors. The purpose of the Sub-Team leader meetings is for the Student and Mentor Sub-Team Leaders to collaborate on team activities, and to update the rest of the Sub-Team Leaders on the progress of activities in their sub-team.

Choosing Student Leaders

Each year, by early August, the Lead Mentors send a request to all students on the team, for the students to express interest and apply for team leadership roles. Any interested student may apply. By mid-August the Lead Mentors select and announce the Student Co-Captains and Student Sub-Team Leaders.

Co-Captains

- Interested students submit a co-captain's application. This consists of a short essay response designed to give the applicants the opportunity to explain why they would be a good captain.
- The Lead Mentors will meet with each applicant for a ~15-minute interview. The interview will focus on the application responses and on the student's activities and impact within the team. Based on availability, a phone/online interview may be conducted.
- The Lead Mentors will meet to make a decision based on all of the information gathered.
- The Lead Mentors will meet with each applicant individually to inform them of the decision and to discuss where we think they can have the biggest impact on the team, especially if they are not selected as a Co-Captain.

Sub-Team Leaders

- Students express interest in a position, and submit a short essay response designed to give the applicants the opportunity to explain why they would be a good Sub-Team Leader.
- The Lead Mentors discuss the position with other students and mentors on the team to get their input.
- The Lead Mentors meet to make a decision.
- If granted the position, the Lead Mentors will communicate this to the student and to the team

Also each year, by mid-August, the Lead Mentors coordinate with all of the mentors on the team to fill the roles of Mentor Sub-Team Leaders.

Student Lead Roles

In addition to the student Co-Captains and student Sub-Team Leaders, the team has numerous opportunities for students to take on lead roles. Some of these student lead roles include the following:

Safety Captain

Spirit

Pit Crew Chief

Strategy Lead

Scouting Lead

Webmaster

CAD Lead

Chassis Lead

Manipulator Lead (multiple)

Bill of Materials Lead

Electrical Wiring Lead

Control Systems Lead

Pneumatics Lead

Manufacturing Lead

3-D Printing Lead

Fasteners Lead

Field Construction Lead

Programming Lead

Technicians

Match Data Analysis Lead

Inspection Lead

Chairmans Lead

WFA Lead

Pit Display Lead

Judge Talker Lead

Photographer

Robot Demonstration Coordinator/Lead

AppleFest Lead

Summer Nights Lead

FLL Tournament Lead

Sponsor Integration Lead (Multiple, one for each sponsors)

Social Media Lead

Fundraising Lead

Competition Drive Team

At the end of the competition season in the spring of each year, the Lead Mentors begin the process of establishing the drive team for the following year.

In the spring, a request is sent to all team members to express interest in being on the drive team, and state which role the student is interested in. Meetings prior to off-season competitions are used to give the drive team candidates time to practice driving and operating the robot and coaching the drive team. Team 1100 uses these practice sessions as well as off-season competitions to evaluate student candidates for next year's drive team.

The drive team is selected by the Lead Mentors based on a number of factors, including dedication to the team, how well students know the robot systems and strategy, how well students work with the others on the team including the drive team coach and the mentors, and of course well they can perform the task of driver/operator/human/coach.

The drive team is finalized by the Lead Mentors in September.

Note that in the past, we have had great success with students that initially did not look that great at driving/operating/coaching/human player; however, through dedication, hard work, focus, a willingness to work with and listen to others on the team, practice, practice and more practice they became very successful.

The human player is also chosen by September. The human player is evaluated based on their dedication to the team, their knowledge of strategy and the robot, and their ability to work with others on the team. If, when the game is released, there is a 'special skill' that the human player needs, we may consider augmenting the drive team with another human player based on that skill (i.e. and 'expert frisbee thrower' as in Ultimate Ascent, etc.)

It has been our practice on Team 1100 not to have first year team members on the drive team. This is because we have a large team, and we give this opportunity to returning students that have shown at least one year of dedication to the team.

The drive team is considered a multi-year opportunity, so that the students on the drive team can practice and improve their performance from one year to the next. Progression within the drive team is also possible. For example, an underclassmen may take on a role and repeat the same role the following year, getting better year after year. In a another example, a student may progress from one role to another - i.e. the driver from one year may become the coach the following year, etc.

While the intent of the off-season competitions is to give new students a chance to be on the drive team, last year's drive team members may also be practicing in off season competitions, particularly if they are interested in a different role on the drive team.

Being on the drive team is considered the student's primary role on the team during the competition season. Team 1100 typically avoids the practice of the drive team members having multiple roles. During the pre-season as well as the build season, drive team members will spend a good amount of time practicing, and will also focus on strategy and the human-machine interface.

Mentors

Mentors are invaluable professionals who volunteer hours upon hours of time each year to the enduring success of the team. Our mentors are the guiding forces who stay with the team to teach, inspire, and empower the students.

Mentor Expectations include:

- Be prompt and ready for action.
- Share your expertise.
- Work with students.
- Let the students do the majority of the work.
- Bring your best, don't hold back expertise, and bring students with you into advanced topics.
- Be fair in all judgment calls.
- Equitably treat all team members.
- Help the students to achieve the goals of the team.
- Inspire and encourage the team when necessary.
- Be a guide on the side.

Section 3: Team Procedures

New Student Recruitment

Eligible Students

Team 1100 is a team focused high school students. The team is open to all ARHS students in grades 9-12.

Recruitment Activities

It is imperative that we recruit new students in order to keep the team sustainable. The team does this by mentoring FLL programs, and demonstrating the robot for schools in Northboro and Southboro. A primary recruiting activity is the annual ARHS club fair held each fall.

Yearly Schedule

The “core” of Team 1100 activities is participation in the annual FRC competition, which kicks off on the first weekend in January, followed by a six week build season. On the third Tuesday in February, work on the competition robot ceases on “Bag Day.” During March, the team participates in two district competitions, each a three day event consisting of one day of robot preparation, tuning, and practice; one and a half days of “seeding” competitions; and finally a half day of elimination rounds.

Following the official FIRST season, the team typically takes part in several local “post season” competitions (for example, WPI’s *Battlecry* and Northeastern’s *Beantown Blitz*); these off season events allow team members to gain experience in operating the robots in a competition environment, and help us train the next year’s drive team.

Following the competition season, the team meets on Fridays during the summer. Preparation for Applefest begins, with refurbishment of some of the team’s prior years robots (replacing control systems, for example), and building specific vehicles for either the Applefest parade or the robotics demonstration to take place at Applefest.

In the fall, once school resumes, preparation for demo events intensifies. Meetings held weekly on Fridays. Exhibitions at local events (Scout meetings, the library, etc.) are performed, the robot room is prepared for the coming build seasons, and preparations begin for the “Savage Soccer” VEX robot competition at WPI. During these preparations, the large team is subdivided into numerous small teams, each led by experienced team members. New students are introduced into the various aspects of building a robot (chassis and drive train, manipulators, wiring and electrical, programming, design and project management), culminating in a competition in early November. Following this experience, we start with safety training on the large equipment in the metal and wood shops, and review our experience and discuss design and build practices, and start organizing the team in preparation for kickoff for the next FRC challenge in January.

Section 4: Student Expectations

General Expectations

Grades

Per ARHS guidelines, if you are on academic probation your eligibility may be curtailed.

Personal Health

We love to see intense dedication to the team, but remember that your health is much more valuable than anything. Like all after-school activities, students are not allowed to participate in a build night if you missed school that day. You should not attend robotics meetings if sick; you need to rest and recover properly so you can return at 100%.

Self-Motivation

Please remember that you are your own best advocate. No adult mentor or student leader can ‘make’ a student do something. This is a self-motivated program. If you want to learn, ask a Mentor, Co-Captain or Sub-Team leader. If you want to work, pick up a tool or ask a leader. We will make every effort to encourage involvement by all students, but in the end it’s up to you. If you are not sure where you fit in or aren’t sure what can be done, please talk to a Mentor or Co-Captain.

Phones

We expect you to partake fully in team meetings and events, which means that you are not on your phones.

Transportation

Students are expected to find their own transportation to and from meetings or may stay after school on weekdays until meetings begin. If a student is having problems finding transportation to or from meetings, we encourage you to reach out to other team members to carpool.

Punctuality

When coming to team meetings, it is expected that you are on time or have communicated your late arrival to a mentor or sub-team leader. Remember, 5 minutes early is on-time, and walking through the door at the meeting start time is late. You must also be prepared for team meetings, bringing any necessary materials, such as safety glasses or computers, with you.

Virtues

You are expected to exude a respectful, gracious professional attitude and practice cooperation, honesty, and integrity at all times. Your team mates, student leaders, and mentors deserve your respect, and you represent Team 1100, ARHS, our sponsors and the FIRST organization to others.

Exploration

Please use your time with Team 1100 to continually expand your horizons. Learn new things, meet new people, and try new experiences.

Commitment

Honor your word: If you commit to a project, see it through. If you are unable to complete the commitment, notify a mentor or captain within a reasonable time.

Safety Expectations

Safety Glasses

Safety Glasses are mandatory in the shop, lab, and competition pits. The team will provide each student with a pair of safety glasses: You are responsible for care and keeping track of your pair and bringing them to team functions. Failure to wear safety glasses will result in removal of the student from the shop, lab, or pits until the situation is remedied.

Hair and Loose Clothing and Shoes

Long hair and loose clothing is a significant risk. All hair should be tied back, and no loose clothing should be worn around machinery and power tools. Closed toed shoes are required.

Horseplay

No horseplay will be allowed in the shop, lab, or pits. These workspaces must be used responsibly and machinery treated with respect. Failure to respect these spaces will result in the student being asked to leave the space.

Machinery

Machinery in the shop is to be respected and used responsibly. It is not to be used without an adult in the room, and certain machinery should be used with direct adult supervision. If a student is unfamiliar with certain machinery, they should ask a mentor for an explanation of how to use it. If a machine should malfunction or a student has problems using a machine, notify a mentor immediately.

The team follows a training model set-up based on this progression:

- Mentor does, Student watches
- Mentor does, Student helps
- Student does, Mentor helps
- Student does, Mentor watches

Other

It is expected that any injury will be logged by the student in the safety log.

There will be a safety presentation, and each student must pass a safety quiz prior to the build season.

Communication Expectations

Email from the Lead Mentor is the primary means of alerting team members of changes in schedules or other time sensitive matters.

The team uses TeamSnap as the main calendar application.

Our website Team1100.org is a valuable source for, news, history, photographs and videos, technical papers, organization and fundraising information.

We have a Facebook, Twitter, Instagram and Snapchat accounts for updates throughout the year.

Become involved with the *FIRST* community at large through the popular Team forums at www.chiefdelphi.com. Remember that you represent our whole team when you post, so behave always with respect and concern for others. Please post responsibly.

Competition Expectations

Team 1100 typically attends Off-Season Events during late spring and fall, and two District Events in March/April. Upon qualifying, we also attend the District Championship (April) and likely would also attend *FIRST* World Championship in Detroit (late April). At these competitions, we expect the following behaviors from Team 1100 members:

Team Spirit

Your enthusiasm and love for your team should show at competition. Cheer loudly. Be optimistic about the future. Don't dwell on the negatives of the one bolt that came loose. Get up and dance in the stands. Competitions should be fun! Don't let a negative attitude ruin it for you and others.

Proactivity

Students will have jobs to do at competitions that help the team compete at a higher level. Which jobs you receive depends on what you did and how actively you participated during the Build Season on your sub-team. When you do not have a specific job that needs attending to, you should be proactive about learning more. You should either be in the pits talking with other teams, attending seminars, or in the stands, actively watching matches and cheering.

Virtues

Competition is not the time to throw the virtues of Gracious Professionalism and Cooperation out the window. It is the time to practice them ever more fully, especially when stakes and tensions are high. Rude behavior towards teammates, mentors, other teams, volunteers, and visitors will not be tolerated.

Uniform

Our team has a very recognizable brand, and it is crucial that you support this brand at competitions by wearing your team shirt. If you are missing a team shirt, please notify a mentor prior to the competition so you can be prepared for the competition!

Safety

For safety reasons, you should always be with another Team 1100 student or mentor. At the very least, two other students and a mentor need to know where you are going. You should also have the mentors' phone numbers in case you need to call them. Only ride in transportation provided by Team 1100 unless cleared with one of the Lead Mentors. Always listen to the mentors.

Students are not permitted to leave the venue without a mentor.

When in the pits safety glasses are mandatory.

Sleep

Competition days can be very long and tiring, so it is crucial that you get enough sleep at night. This is typically more difficult during our traveling competitions due to the allure of staying up late and talking. Team bonding is good, but you must get enough sleep so that you won't fall asleep the next day at competition. Sleeping in the pits and stands isn't acceptable.

Travel Eligibility

Traveling with the team to competitions is one of the most fun experiences of the season. To be eligible to travel, particularly during school days, you must have met the following requirements during the build season:

- 50% meaningful attendance
- Passing the Safety Quiz
- Understanding of the team's mission and goals

Parental Involvement

Parents are a critical part of the team! In addition to providing transportation to and from meetings for students that can not yet drive, parents are encouraged to get involved in the following ways.

1. **Team meals during build season.** Parents will be asked to sign up to bring/support team meals during the build season.
2. **Building field elements.** Most years the team requires field elements from the game in order to design and test the robot. If you are interested in volunteering to help build these elements for the team, please let us know. Official drawings for field elements (listing dimensions, materials, and assembly instructions) are provided by *FIRST* at kickoff each year.
3. **Become a mentor!** The team wouldn't exist without a robust crew of mentors, and interested parents are more than welcome to join us. Mentoring takes on many shapes and sizes, and the time commitment can be tailored to the task at hand. For example, helping the team with grant writing or presentation skills may be a smaller commitment than helping with the robot construction.
4. **Support the team at competitions!** From cheering in the stands to volunteering on the field or in the pits, the team and *FIRST* needs as much support as possible to make our competitions a success. If you're available during one of the events, please ask a mentor how you can get involved!