



# The MidKnight Inventors

# TEAM HANDBOOK

West Windsor-Plainsboro Regional School District  
2018-19 School Year

Written & Provided by FRC 1923: The MidKnight Inventors  
West Windsor-Plainsboro Regional School District  
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# **SECTION 1: INTRODUCTION TO ROBOTICS**

## **1.1: What is FIRST?**

FIRST was started in 1989 by inventor Dean Kamen. The FIRST (For Inspiration and Recognition of Science and Technology) programs aim to create passion for science and technology in students. The FIRST program encourages Gracious Professionalism and “coopertition”, sportsmanship amongst teams even in the face of competition. Through FIRST, students build technical skills, and foster teamwork and leadership skills.

FIRST has four divisions: FIRST LEGO League Jr. (FLL Jr.), FIRST LEGO League (FLL), FIRST Tech Challenge (FTC), and the FIRST Robotics Competition (FRC), serving the full spectrum of K-12 education.

In addition to building a robot, students learn to spread their passion for science and technology in our community, raise funds to support building the robot, and manage a budget. FRC caters to a variety of interests: computer science, engineering, physics, math, graphic/video artistry, business, communications, and writing. No matter where your interests are, there is something waiting for you on our team!

## **1.2 About WWP Robotics**

Students of the West Windsor-Plainsboro Regional School District may join any of our WWP Robotics teams. The overall program aims to support FRC and FTC teams directly, but also coaches & mentors FLL and FLL Jr. teams, establishing a pipeline of STEM students throughout the school district.

## **1.3 About The MidKnight Inventors**

Team 1923: The MidKnight Inventors was established in the fall of 2005. The team was started by a small group of students at WW-P High School North, but expanded in 2009 to include students from High School South as well. Today, WWP Robotics is one of the largest co-curricular activities in the district, with over 130 student team members representing both high schools in the West Windsor-Plainsboro Regional School District, as well as a large family of other FIRST programs for grades K-8.

Over the past few years, the team has greatly increased the awareness of FIRST programs throughout the community with various outreach events. We have participated in events such as Plainsboro Founders’ Day, Girl Scout and Boy Scout fairs, and demonstrated our robots for all ages throughout the year. We also host our own FRC postseason competition, MidKnight Mayhem, an FLL qualifying competition, and numerous scrimmages for FLL and FTC teams in the area. The team has also expanded its outreach internationally, with presentations in India and Switzerland, as well as robotics classes in Africa.

The MidKnight Inventors recruit students from both high schools but our shop, meeting and practice space is located in Room 308 at High School North. This space was given to us by the school district and is meant to be the 'home' of the team; a collaborative space where our FIRST teams work together to grow STEM alongside the WW-P curriculum. Team meetings are typically also held at HSN in the Dining Halls, but due to room restrictions or other events, may also be held at HSS or another WW-P school venue.

## **Team History & Achievements:**

### **2018:**

Mt. Olive District **Industrial Design Award**  
Bridgewater District **Finalist**  
Bridgewater District **Chairman's Award**

### **2017:**

Mt. Olive District **Winner**  
Mt. Olive **Excellence in Engineering Award**  
Montgomery District **Winner**  
Montgomery District **Entrepreneurship Award**

### **2016:**

Mt. Olive District **Chairman's Award**  
Montgomery District **Entrepreneurship Award**  
Mid-Atlantic Championship **Chairman's Award**

### **2015:**

Mt. Olive District **Judges' Award**  
North Brunswick District **Chairman's Award**  
New York Tech Valley Regional **Engineering Inspiration Award**  
**Woodie Flowers Finalist Award (Libby Kamen)**  
Mid-Atlantic Championship **Dean's List Finalist (Rohan C.)**  
**World Championship Curie Division Winner**

### **2014:**

Mt. Olive District **Creativity Award**  
Mid-Atlantic Championship **Dean's List Finalist (Michael F.)**  
**World Championship Dean's List Winner (Michael F.)**

### **2012:**

Hatboro-Horsham District **Engineering Inspiration Award**  
Mt. Olive District **Team Spirit Award**

### **2011:**

Connecticut Regional **Winner**  
Connecticut Regional **Coopertition Award**  
Connecticut Regional **Gracious Professionalism Award**

### **2010:**

Boston Regional **Engineering Inspiration Award**  
New Jersey Regional **Dean's List Finalist (Krishna Y.)**

### **2009:**

New Jersey Regional **Winner**  
New Jersey Regional **Judges' Award**  
Philadelphia Regional **Judges' Award**

## SECTION 2: TEAM STRUCTURE AND PROCEDURES

### 2.1 Mentors

Mentors are adult volunteers who donate a great deal of their time and effort to help students on WWP Robotics teams. Mentors assist with team organization, technical support, and support the students in all aspects of running an effective team. Being a FIRST Mentor requires dedication and a significant time commitment. Our team's mentors work extensively with team members during the season as they design, build, and fabricate a functional robot for competition as well as assisting with business development, outreach events, and any other team needs. Their expertise and guidance is the catalyst for the team and students' success. Mentors engage and inspire students in ways far beyond science and technology. They enable both students and adults to appreciate the value of sportsmanship, teamwork, and FIRST's credo of *Gracious Professionalism®*.

**2018-2019 Team Advisor:** Mrs. Libby Kamen Drost

**Assistant Advisors:** Mr. Louis Brottman, Mr. Eric Drost, Mrs. Susan Putnam

#### Adult Volunteer Mentors

<b>Mr. Samuel Becker</b>	Mechanical, CAD
<b>Mr. Jeff Drost</b>	Mechanical, CAD
<b>Mrs. Catherine Foley</b>	Outreach
<b>Mr. Tim Foley</b>	Mechanical, CAD
<b>Mr. Sarath Jaladi</b>	CAD, Mechanical, Strategy
<b>Dr. Ruth Kamen</b>	Outreach, Awards
<b>Dr. Michael Stevens</b>	Mechanical

Please note that additional mentors (including professional engineers) will be added as necessary to assist with build and team functions. All mentors have background checks and are fingerprinted & approved at school board meetings.

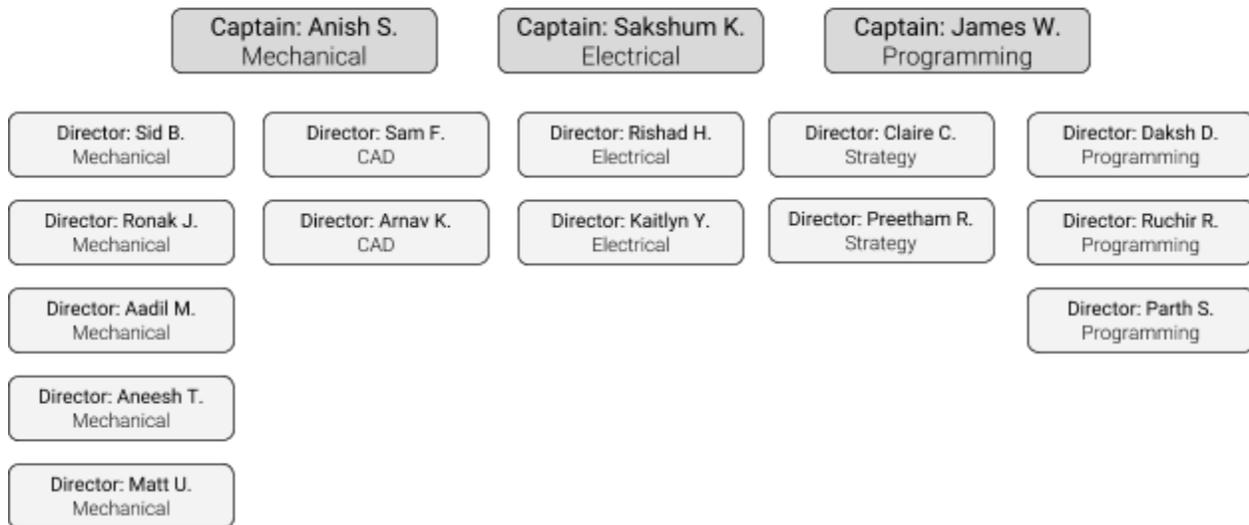
WWP Robotics teams are also supported by an active parents' group. We always welcome parents and other community members who want to support and help the team in any way, big or small. Please see further information on Parent Involvement in section 3.11.

## 2.2 Team Leadership

Our team maintains a leadership structure involving Captains and Directors to ensure success on all projects and management of the team's responsibilities. FRC teams divide into 'subteams', which will work on projects across the various disciplines of the team's activities. Those subteams are divided across two branches of the team, the Robot Branch and the Sustainability Branch.

Captains are responsible for management of the leadership structure and education of new team members. Directors are responsible for the success of that subteam's assigned tasks. All leaders are expected to show commitment to the team and FIRST's goals. Leadership will help guide the students in each subteam toward their goals, as well as work as a committee to oversee the team's activities as a whole.

### ROBOT BRANCH LEADERSHIP



### SUSTAINABILITY BRANCH LEADERSHIP



Captain and Director positions are chosen by the Advisors and Mentors, after students complete an online application process and, for prospective Captains, an interview. Leadership requires a high level of commitment in responsibility as well as time. Those who are unwilling to make such a commitment should not apply for a leadership position. Leaders are held to a high standard and must serve as role models to other students. Again, students who seek leadership only to enhance their resume need not apply.

To be eligible for leadership, students must have completed at least two (2) of the following in the previous season:

- Attended at least two (2) regional, district, championship competitions.
- Participated in at least 75% of team build sessions and team meetings during school season.
- Active participation (beyond the standard) in Fundraising and Outreach events
- Have written/co-written for our media team, website, or for FIRST awards.

Leadership on The MidKnight Inventors is an intense commitment, and your team will hold you to a high standard. Once selected, here's what is required for all leaders within the structure:

- 80% minimum attendance to all leaders' meetings, including summer sessions
- 75% minimum attendance to team meetings, including build season
- Engagement with subteams in the opposite branch (e.g. involvement with a non-technical subteam as a Build Director, involvement with a technical subteam as an Awards Director)
- Competition Attendance: All roles must be represented by at least one of their leaders at events.
- Communication with other leaders, the Advisor and mentors. No work happens in a vacuum!

If during the course of the season, it becomes apparent that a leader is unable or does not wish to fulfill his/her role, the advisor, in conjunction with mentors may decide to replace the current leader with a student who meets the leadership criteria and has shown interest and commitment in a particular area.

## **2.3 Selecting a Subteam**

Each member of the team needs to contribute in both technical and non-technical areas to ensure the success of the team. If there is a particular sub-team you are interested in, you may ask the sub-team's leader on how to join or help. Keep in mind that if you are listed as part of one subteam, you always have the opportunity to assist and take part in other subteams. All students will be assigned to one or more subteams based on their interests.

**Each fall the Directors, Captains and Mentors conduct MidKnightU, a series of workshops and an orientation program describing what each sub-team is responsible for during the year. Attendance for MidKnightU is mandatory to be considered a part of the team. More than two absences will disqualify you from travel.**

While each subteam maintains a level of independence over their given system, all students work together with the Directors to ensure smooth workflow and clear communication across the team(s).

**The main sub-teams of The MidKnight Inventors are defined as follows:**

**Mechanical:** Responsible for all the mechanical components for the robot. Example tasks include: prototyping potential robot designs, interpreting CAD drawings to build the drive train and various manipulators on the robot, and iteration of robot design.

**CAD (Computer Aided Design):** Responsible for working with Mechanical & Strategy team on creating computer renderings of the robot, design prototypes, or other ideas that may need 2D or 3D models to work from. Convert CAD models into formats that our CNC equipment can use.

**Electrical:** Responsible for all the electrical components of the robot. Example tasks include: planning out the electrical board layout in CAD, wiring all necessary electrical components to power and signal, working with sensors, as well as communicating effectively with Mechanical, Programming and CAD sub-teams.

**Programming:** Responsible for the software of the robot. Example tasks include: programming the different components (controls, motors, actuators, etc) of the robot, programming visual detection methods, and updating computers and phones with the most recent software,.

**Business:** Responsible for overall finances of the team. Example tasks include: creating the team's fundraising packet, keeping track of income/expenditures, presenting to potential sponsors, coordinating fundraiser events.

**Outreach:** Responsible for promoting STEM in the community and documenting our events and programs. Example tasks include: presenting and explaining the FIRST program and values at community events, preparing for awards, writing awards submissions and creating graphics and videos for the team presentations.

**Strategy:** Leads both the strategic portions of the robot design process, as well as at-competition match strategy and scouting of other teams' robots. This subteam is fast paced and helps determine a great deal of our competitive success. Example tasks include: discussing priorities & the priority list at kickoff, scouting robots at competition.

**Media/PR:** Responsible for the branding and messaging put out by the team – on our website, Facebook, Twitter, forums, etc. Also works on the team's uniform, pit, and giveaways, maintaining a consistent look for the teams across all places.

## 2.4 Robot Design Process

This quick at-a-glance view of the build season will allow students to obtain a better understanding of how our team works through the season, but is not a complete guide – mentors & student leaders will continue to define and re-work our objectives per week as the season progresses. A design/progress review will be held weekly to determine what we need to meet the goals we set during the early days of the build. During this review, we also evaluate changes that may need to be made to fit the priority list.

**Our design process for the season starts with the FIRST Kickoff event on January 5, 2019.** Once the game is announced at Kickoff, the full team meets to interpret the game and discuss various strategies. By the end of this day, the goal is to have decided on a basic game play strategy (what type of robot it will be; defensive, offensive, both, etc.) for the season and to provide a list of essential robot qualities that we will design for later. This list will be referred to as the “Priority List” throughout the season. Students are then required to thoroughly read and learn the rules of the new game over the first few days of the game reveal. Reading the rules ensures a competition-legal robot and results in game-winning strategies.

**Kickoff:** After everyone has read the rules of the game we analyze the game and start to discuss strategy, concepts, and design solutions. It is essential to the design process that we analyze the game and fully understand the scoring system before designing our robot. CAD (Computer Aided Design) and Strategy are critical subteams during this and the next few stages of the season, for conveying ideas and designing parts and prototypes for the robot.

**Week One:** Planning & Prototyping. The team starts the week by finalizing and defining our list of season priorities and the overall strategy of our robot’s design. Once a finalized priority list is generated, prototype designs will be discussed and proof of concept designs will be built. Strict time goals will be set during this period for each major aspect of the robot. CAD models of the drivetrain will be completed by the end of week one.

**Week Two:** CAD & Initial Manufacturing. After deciding on the most effective design through our prototypes, this week is spent perfecting the chosen design and creating parts. CAD helps us to convey ideas and visualize any problems that may occur throughout the season. Drive base construction is usually completed during this week. This week’s Design Review will focus on adjusting any time goals as necessary.

**Week Three:** Critical Design Review. During this week’s session, we reflect on our design and build schedule to see if we are on target with our schedule. During this time we may eliminate components deemed unnecessary or too difficult to produce. Moving forward, we iterate on the concepts we have that work, and eliminate those that don’t.

**Weeks Four- Six:** Iteration & Completion. As we approach the end of build season, we continue reiterating these designs and start practicing for competition. During this period, manipulators, bumpers, and aesthetic additions must be completed. Miscellaneous final robot tasks such as wiring cleanup & sponsor acknowledgement will occur and spares are produced. Programming subteam refines autonomous modes & sensor integration, and the strategic & drive team begin intense practice.

**Competition Season:** Building of the robot does not stop after the build season. Improvements and calibrations are also made before, between, and during competitions. New prototypes may be constructed and tested based off successful designs seen at competition. Spare parts must be manufactured and general robot maintenance will occur.

Between competition events, the team will re-evaluate our design against the team's priority list and make plans to improve and iterate; the robot we came up with at the beginning of the season may look completely different by the end of the season!

## 2.5 Decision Making

Students, parents and mentors should understand that while this is a learning environment, we are a competitive team and that not every idea design, or thought by a student/mentor/parent may be realized. The team will listen and respect all ideas presented, but not all will be put into practice.

Based on time and funding constraints, as well as the dynamics of the challenge, some decisions may have to be made by the leaders & mentors for the benefit of the team.

At all times, the Advisor and Mentors are responsible for ensuring that all decisions (including but not limited to: robot design, student participation levels, work group makeup) are made in the best interest in the majority of students and the team a whole. These decisions are made only to benefit the team and will be reflected in the Engineering Notebook & other team documentation.

## 2.6 Expenditures

We must adhere to our team's planned and approved budget. The teams each fundraise a given amount through team fees, sponsorships and grants; the Advisor and Mentors will help guide the students through maintaining an appropriate documentation of their purchase process.

Before purchases are made on behalf of the team, the purchase must be approved by a Mentor and then by the Advisor. The finances of the team are handled through WW-P High School North, and as an official school team, we must follow district procedures.

PLEASE NOTE: The team will not reimburse items ordered or paid for by team members, families, volunteers or mentors without the proper approval procedure. Please make sure the expense has been approved before making any team purchases.

## 2.7 Competition Roles

At competition, every single member of the team is responsible for the team's success. Each job serves a critical role in the success of our team.

### I. Drive Team

The Competition Drive Team is made up of 4 positions:

- Driver: Responsible for driving the robot on the game field
- Operator: Responsible for controlling manipulators on the robot
- Human Player: Responsible for retrieving and returning game elements through mechanisms provided by game field. The exact role is modified every year according to the game rules.
- Coach: Responsible for being the "eyes of the match" directing the driver and operator through an adaptive strategy while monitoring the time, the score, and actions of other robots.

The coach is a pre-selected adult mentor who will be responsible for working with and synergizing their Drive Team throughout the build and competition season, as well as working with the Strategy subteam and mentors to generate the season's various plans & plays.

The Competition Drive Team is selected through the following process:

A written test is given evaluating the game rules and knowledge about WWP Robotics programs, as well as what to expect during an actual competition. Students who pass (>80%) this exam will then be given an opportunity to demonstrate drive team skills in a series of trials.

Mentors watch the candidates through practices and trials to assess communication skills and the ability to drive/operate successfully. We also routinely pair up different driver/operator combinations until we select the combination of people that we believe will work the best. These trials are specifically designed to display the abilities and skills of all the candidates and simulate how they would perform under real match conditions/scenarios.

**Since the Drive Team *IS* a team, we will select students for positions based on their ability to work well with each other as well as their objective skill. Teamwork, communication and demonstrated leadership are key here.**

We will also select a back-up team that will be ready to perform in case our drivers fall ill or cannot make an event due to an emergency. This back-up crew has the same responsibilities as

the drivers, and Mentors (with Advisor approval) may choose to substitute a back up team member at any time.

Mentors choose the candidates that can work well under pressure, work cooperatively with the rest of the team, and have a positive attitude towards the team, team members, and driving. The Competition Drive Team members must not only communicate well with each other, but also with the Backup Drive Team and other members of the team. You are expected to attend all competitions if you are selected for a drive team (or backup drive team) position.

Drive Team members are responsible for:

- Attending all scheduled practices between and during competitions
- Attending all competitions
- Understanding the mechanics and design of the robot
- Knowing the details of our outreach efforts and community service activities
- Helping the team & team members whenever possible.
- Having a complete understanding of FIRST's rules and regulations to minimize errors and penalties during competition.
- Listening to their coach's instructions and following through both during the match and off the field.

## **II. Presenters**

Presenters are a group of 3-5 team members who interview with competition judges and must demonstrate knowledge on the following topics:

- Design Process, Robot Construction, Electrical & Programming
- Outreach Events & Community Service
- Team commitment to FIRST values & principles
- Overall FRC team dynamics & K-12 WWP Robotics programs

Like the drive team, Advisors & Mentors will work together in choosing presenters. We will ask interested students questions ranging from building the robot to outreach & business, to ensure they have a full picture of the team.

Presenters should be confident, enjoy talking to others and prepared to answer any question that the judge may ask. Presenters will be expected to attend all scheduled practices as well as the team's competition events. Similar to the drive team, the Mentors may choose to train back-up presenters in the case that a team member falls ill or encounters an emergency.

## **III. Pit Crew**

At competition, knowledgeable team members are needed to troubleshoot various aspects of the robot and speak to judges. These team members, referred to as a pit crew, will stay in the pit area as necessary. When other team members visit the pit area, they must follow all safety

precautions and be courteous to the pit crew. Mentors and student leaders reserve the right to ask team members to return to the viewing stands at any time, since overcrowding can lead to safety hazards and impede robot repairs.

Students who are selected to be part of the pit crew may include the drive team, awards presenters, team leaders, and others who have demonstrated exceptional talent in manufacturing and design of the robot. These students will be approached by the Advisor, in conjunction with the Mentors. They may also be tested on their knowledge of both the robot and other aspects of the team, such as award submissions and team history.

The pit crew is also responsible for speaking with judges at competitions when they approach the pit. Each pit crew member should be able to specifically describe various aspects of the robot, and what the robot does on the game field. The pit crew also needs to have knowledge of the team's offseason events, fundraisers, and outreach activities. Since it is unknown which judges will visit the pit to ask the team questions, all members of the pit crew must be able to talk about all aspects of the team, including the award submissions, business plan, safety procedures, and the robot.

#### **IV. Scouting**

The most critical role to our team's on-field success is scouting & strategy work. All student team members without an assigned role in the Pit Crew, Presentation or Drive Teams will be responsible for scouting. Good scouting reflects how well a team's robot does in competition; it leads to a good strategy, which leads to a winning robot. An average robot can beat a good robot if the drive team has a strategy to defeat them. Therefore, scouting is an essential part of our competition success. We expect all team members to take scouting seriously and listen to their strategy director and Mentors for instructions. Improper scouting will result in removal from the travel team.

## **2.8 Fundraising and Financial Obligations**

### **I. Team Registration Fees**

Team fees are determined at the beginning of each school year and will be based in part on the team's successful fundraising activities and donations. Apart from the team fees, it is anticipated that there will be additional transportation costs involving travel to competitions.

The fee for the 2017-18 season is \$300. After the due date of October 15th, additional late-fees may be applied. After a student commits to the team, unpaid fees will result in an obligation on the student's record. This is non-refundable, regardless of a student's choice to remain on the team throughout the school year or season.

Team Fee payment includes:

- Membership on the FRC team
- Attendance at various team events (outreach events, fundraising events) Opportunity to enroll in courses in Java, CAD, and other team activities
- Ability to travel to off-site and on-site competitions with the team.
- Access to tools and equipment in build site once certified
- Team uniform (team t-shirts and polos)
- Permission to participate in the team's off-season events

The deadline for team fee payment by returning members is June 30, and the deadline for new members is October 15.

## **II. Competition Travel Fees**

Each event's travel costs will be priced based on distance & other expenses, such as hotel accommodation. The average cost in 2016-17 was between \$20 for a single-day event and \$250 for a weekend overnight event. If the team advances to the World Championship in Detroit, we anticipate the travel fees for that event will be significantly higher due to distance and length of competition (~\$650). These fee estimates are based on the average student occupancy of four students per hotel room on overnight trips.

Please keep in mind that attending competitions is not required, except in the case of those students who are interested in a team leadership position or those students on the drive team.

For more information, see exceptions for drive team & leadership, and definitions for active team member. Once a student has registered for an event, the fee is due and payable by check made out to "WW-P HSN Robotics", footnoted with the student's name in the memo field, along with a signed permission form given to the Advisor by the deadline. Other forms or paperwork may need to be submitted to the Advisor to travel to certain events and competitions. All of the paperwork must be submitted for a student to attend an event. If the cost to attend an event is too expensive for a member of the team, then the student can speak with the Advisor about possible aid. We do not want to keep dedicated students away because of the travel cost!

The WWP Robotics fee for the 2018-19 season is \$300. This is non-refundable, regardless of a student's choice to remain on the team throughout the school year or season.

The one-time payment of team fee does not cover the travel costs to various off-season events. Each event's travel costs will be priced on distance & other expenses, such as hotel accommodation. The average cost in 2017-18 was between \$20 for a single day event and \$250 for an overnight event. Please keep in mind that attending competitions is not mandatory,

except of those students who are interested in a team leadership position, the drive team or the presentation team.

If the team advances to the World Championship in Detroit (late April) we anticipate the travel fees for that even to be significantly higher due to the distance and length of competition (approx. \$650).

Once a student has registered for an event, the fee is due and payable by check made out to "WW-P HSN Robotics", footnoted with student's name in memo field, along with a signed permission form given to the advisor by the deadline. Other forms or paperwork may need to be submitted to the advisor to travel to certain events and competitions. All of the paperwork must be submitted by the stated deadline for a student to attend an event.

If the cost to attend an event is too expensive for a member of the team, the student can speak with the Advisor about possible aid. We do not want to keep dedicated, committed students away because of the travel cost!

**Refunds cannot be made once the student has made a commitment to travel.** Many hours go into planning an event based on the student participation, making refunds impossible. If a student signs up to attend an event, the fee is due by the deadline. Failure to pay the fees for a trip the student registered for will result in an obligation to the team on the student's record that must be met before graduation.

### **III. Fundraising**

Fundraising: All MidKnight Inventors are required to participate in team fundraisers throughout the year. Fundraising is an important obligation for all team members. Not only does it help the team raise money for team expenses, but it builds important partnerships with local businesses, the community, and donors. Fundraising events spread awareness of the team and FIRST in our community, and gives students experience with making presentations about the team to potential sponsors.

Fundraising will also help to reduce the cost of travel to off-site competitions such as the World Championship in Detroit. It is up to the team and its students to take the initiative on extra fundraising, so that they can minimize the cost-per-family to attend.

Apart from the various fundraising events, students will work with the Advisor and Mentors to solicit donations from businesses and fellow residents in the community, as a part of meeting their fundraising requirements. Parents are also invited to work with the Advisor and Mentors to secure donations from sponsors and will be called upon to assist at fundraising events.

**Minimum Fundraising Requirement:** In order to travel to any competition during the 2018-19 season, students must participate in a minimum of 70% of fundraising events per semester, including participation in our mandatory large events (e.g. FLL Qualifier, Innovation Fair, MidKnight Mayhem, etc). A list of fundraising activities will be provided at the beginning of the school year. Participation entails being present with the team and actively helping the team at the venue. The Advisor, in conjunction with the mentors in charge of the event, will define the necessary time commitment for each event.

## **SECTION 3: MEMBER & TEAM EXPECTATIONS**

### **3.1 Enjoy Yourself!**

*"This is the hardest fun you'll ever have!"*

We are a competitive team, but that doesn't mean we don't know how to have fun. As long as you are staying within the rules of the team, school district policies and follow FIRST's credo of Gracious Professionalism, there is no problem! After all, we're here to experience science & technology teamwork in a positive and fun environment.

### **3.2 Academic Standing**

WWP Robotics regards academic performance and student behavior as extremely important factors in team success. We follow the same rules for club participation as those listed in the WW-P North and South student handbooks. Please refer to your student handbook regarding academic standing.

### **3.3 Participation**

Team members are expected to work hard for the success of their team. This includes completion of assigned work by the deadline, active participation in discussion and robot work, as well as clear communication via team tools (Discord, Email, Engineering Notebook).

We are a team, and there is no need for any one team member to do all the work on their own. Students will be assigned to subteams and committed to collaboratively meet team objectives.

**This is a self-motivated program. We will open the door, but it's up to you to step through it!** Leaders can show or tell you what to do and help make sure you are given a chance to help the team. Students will gain the experience to take on leadership opportunities in the future. The more dedication and time spent learning, the more opportunities you will find!

**Remember to check your email and the team's Discord server daily.  
Team communications are frequent, and they will open opportunities for you!**

### 3.4 Attendance

Students must maintain good standing on the team in order to attend competitions, off-season events, and other activities. Good standing is determined by participation, attendance, and a positive, collaborative attitude. Team members will need to follow the guidelines outlined below and be an active participant within the team.

Each student will sign in at the meetings. This gives the mentors an idea of how dedicated you are. We understand that other obligations may compete for your time. Remember, however, that a student's standing is determined by their participation when they are present. Attendance does not mean that students show up and loiter; we want you to be engaged in the discussions and projects.

The Advisor & mentors should be informed of all other commitments at the start of the school year and ahead of the build season. It is highly recommended that all team members attend every meeting. If you are not able to attend, you must inform the Advisor by email prior to the meeting time.

Fall Semester:

- Our team meets every Monday for MidKnight U sessions. Missing more than two sessions will disqualify students from the travel team.
- Business, Outreach, Awards & Event Planning committees have weekly meetings of their own, listed on the team's calendar.
- Tool Certification, as well as Java and CAD training sessions, are held in the fall semester.
- We host several events during the fall which students are expected to participate in, in addition to their fundraising and outreach requirements (for example, our FIRST LEGO League State Qualifier, November 17th 2018).
- Mock Kickoff is a trial version of our strategic breakdown program, in order to accurately prepare our students for the upcoming season. Mock Kickoff is required for new students & students in the leadership, and highly encouraged for veteran MidKnight Inventors.

Spring Semester:

- Monday All-Team meetings continue. Missing more than two sessions this semester will disqualify students from the travel team.
- Business, Outreach, Awards & Event Planning committees have weekly meetings of their own, listed on the team's calendar.
- The six-week FRC Build Season for 2019 starts with Kickoff on Saturday, January 5, 2019. Attendance at Kickoff is required for travel team eligibility, and it is highly suggested that students attend the next few crucial strategic meetings.
- Build Sessions: Students will sign up for a technical subteam, as well as a 'robot workgroup'. Since we build two machines, each one gets a nickname. (2019; tentatively Stark and Banner). Workgroups meet on alternating days. There will be days each week

where only specific subteams are called in; others will be open to all subteams due to the volume of work in progress. We ask that students participate in at least 60% of the sessions they are called in for, in order to be eligible for travel team.

- Monday: All Team Meeting
- Tuesday: Stark, 4-8pm
- Wednesday: Banner, 4-8pm
- Friday: Banner, 4-10pm
- Saturday: Stark, 12-6pm
- Our team takes part in several events that students are expected to take part in; the WWP Education Foundation Innovation Fair, May 18 and MidKnight Mayhem, an FRC post-season competition June 22.

Students will arrive on time and stay for the entirety of their session. No team member is dismissed from a team meeting until the work is complete and the work area is completely clean. Students must be picked up from meetings in a timely fashion; Mentors are required to wait until all students are picked up before departing, and we are not a babysitting service.

We understand that other obligations may compete for your time; and that's okay. A given student's standing on the team is determined by their attendance, but also by their participation when they are present. We expect that when students are present; they are working hard.

***We understand that school and family come first.  
If you have a conflict, PLEASE let the advisor know.***

IMPORTANT: Any cancellations of school for weather or holiday will certainly excuse an absence. However, we may still be working remotely in cases where possible). Please check your email and Discord in these cases.

**The Advisor/Mentors will only sign off for merit-based applications if the member has been active participant in many aspects of the team and meets the attendance requirements.**

### **3.5 Travel Eligibility**

In order to be eligible for travel to any competition during the 2018-19 season, students must meet the minimum Fundraising and Outreach requirements, as well as their attendance and participation guidelines each semester. Advisors and Mentors keep track of these factors and maintain a list of eligible students throughout the year.

**Attendance:** Students must meet the minimum attendance for team meetings during each semester, including participation in required hosted events and the build session expectations (60% of session hours). Students must also be eligible through the school in both academic and disciplinary areas. Attendance at meetings may not be counted if students are not participating in the meeting or violate team policies. **Participation does not simply mean showing up; it requires engagement with the material and your enthusiasm!**

**Fundraising:** Students must participate in a minimum of 60% of fundraising events per semester. Opportunities will be provided throughout the school year, and some events (such as our hosted FLL, FTC, and FRC tournaments) will require our entire team based on size and scale. Participation entails being present with the team and actively helping the team at the venue. The Advisor, in conjunction with the mentors in charge of the event will define the necessary time commitment for each event.

**Outreach:** Students must also participate in a minimum of 60% of our team's outreach events each semester. Our outreach calendar is always full, and some events (such as our hosted FLL, FTC, and FRC tournaments) will be required for all team members. Again, participation entails being present with the team and actively helping the team at the venue. The Advisor, in conjunction with the mentors in charge of the event will define the necessary time commitment

**Travel Paperwork & Payments:** All team members must have their permission slips, travel paperwork, and payments submitted to the Advisor by the assigned due dates. If a due date passes and the requirements are not met, the student forfeits their space on the trip (but still owes the fee).

### **3.6 Acceptable Behavior**

Students must conduct themselves in a respectable manner consistent with West Windsor-Plainsboro Regional School District's policies and procedures at all times; in meetings as well as on trips. The Advisor and Lead Mentors reserve the right to remove a student from the team at any time, provided they have reasonable cause of misconduct.

Team members also represent our team's sponsors. We expect all students, parents and mentors to behave in a way that is acceptable and expected of professional standards. At all times, students are expected to be respectful of other students, adults, and facility and practice their the facility and practice their Gracious Professionalism®, a core FIRST value.

Students are expected to be respectful at all meetings. Side group conversations and cell phone usage is not acceptable when anyone is talking and you will risk having your device taken away for the remainder of the meeting or being asked to leave. Students are encouraged to ask questions after the discussion when the leader finishes talking.

Safety is the team's top priority, especially at the build site. Students are expected to be responsible for themselves, especially while using the team's property, tools and computers. Students are also responsible for knowing how to operate the tools and/or use team property appropriately with the guidance of a mentor. Closed-toe shoes and safety glasses must be worn at the build site and at competitions at all times. Long hair must be tied back.

Demonstrate your Gracious Professionalism at all times, both within the team and externally. Any team member representing the team on public forums (Facebook, Twitter, Reddit, Discord servers, Chief Delphi, etc.) must have spoken with the Advisors concerning their account on the site and run all drafts of messaging for approval before posting.

### **3.7 Competitions & Events**

#### **I. Uniform**

WWP Robotics dress code for competitions & public events is as follows:

- Team Shirt or Polo (depending on the event)
- Long Pants without rips, holes, or tears
  - Jeans or Khakis – no sweatpants, leggings, shorts, or athleticwear
- Closed-Toe Shoes
  - Skele-Toes, Crocs, etc not permitted
  - Sneakers encouraged – our events are often long days on your feet!
- ANSI rated Safety Glasses.

Students out of uniform when loading the bus for a trip will not be permitted on the trip. On overnight trips, if a student is out of uniform on an additional day (packed the wrong items, for example), they will be required to sit in the stands for the duration of the event.

Our team does offer additional uniform items at an extra cost (extra shirts, customized hoodies & jackets, bags, hats, etc) but these are by no means required; parents may purchase these as well to help display some additional WWP Robotics spirit.

While we encourage additions to the uniform for team spirit, please add 'flair' respectfully and within our team's branding guidelines. You may not cut, alter, or modify your team uniform shirts out of respect for our team's imagery. For complete understanding of our team's branding, please see the Team Branding Package provided by the Advisor.

#### **II. Behavior**

At competitions, all team members are expected to be respectful of other teams and refrain from all unsportsmanlike performance. Team members are expected to remain in the stands for the majority of the competition with the exception of food, bathroom, and Pit trips. If leaving the stands for any reason, team members are required to tell an adult mentor or chaperone. This is

to ensure the safety of the student and to keep our section in the stands during competitions. During the match, you are expected to be cheering and supporting our team. You can stand up to cheer when our team is playing however make sure you are not in the way of other teams' visibility to the field. In short; always look like you want to be at the competition! If you're not interested in attending, there are plenty of other teammates who will take your spot.

Students may not play video games or use any other multimedia devices at competition events; these include Laptops, Kindles, iPads, iPods, mobile phones etc. This includes creating personal hotspots at events, as all wireless use is banned there. Please adhere to the listed event rules in the FIRST manuals for additional rules at competition events. There are NO wifi hotspots allowed in an event venue.

During the awards ceremony team members are to show Gracious Professionalism to other teams by standing and clapping for their wins; just as we would want them to stand for ours. Our standard behavior expectations are listed in the acceptable behavior section.

At the conclusion of competition all teammates are expected to help clean up the viewing stands after competition, throw out trash, pack scouting boxes, as well as help take down the Pit area and pack our truck/bus to head home. Once we arrive at HSN with our cargo, team members should help unload a few items back into Room 308 before being dismissed.

### **III. Scouting & Strategy**

Scouting is an important part of the competition we attend, and the team as a whole. If you are in the stands, you're expected to scout as needed (regardless of your position on the team). There will be plenty of opportunities to learn how to do this; and all students attending competition are required to have a working understanding of how our scouting system works. Collecting match data is one of the most integral parts of our success at events, and all team members on the trip will be asked to take part in data collection or match analysis at some point.

### **IV. Overnight Trips**

Often, the team will stay at hotels for overnight events. In those cases, students must adhere to the hotel's policy and regulations as well as school district policies and agreements. Students are prohibited from using the swimming pool or exercise center without prior approval by Mentors & Advisor.

In addition, team members are not allowed to use the microwave, stove, oven, etc. Mentors will lay out the rules regarding ordering food, going to other rooms, etc, and these rules must be followed. Students are expected to be respectful to the hotel staff and others staying at the hotel. Failure to comply will result in the student being sent home from competition. The hotels that we stay in are generous enough to accommodate a large number of us, but they also

reserve the right to remove us or prevent us from staying in the future, so it is important that MidKnight Inventors behave respectfully.

If these expectations are not followed, Advisors reserve the right to send a student home from travel at their parents' expense, or to bar them from further competition travel during the season.

### 3.8 Self-Motivation

Please remember that you are your own best advocate. No adult mentor or student captain/leader will 'make' a student do something (or worse, do it for them). **This is a self-motivated program.** If you want to learn, ask a Mentor or Captain. If you want to work, pick up a tool or ask a Leader (That is what they are there for!) 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 of what can be done, please talk to a Mentor. Self-motivation is what drives The MidKnight Inventors!

### 3.9 Communication

All communications with regard to team meetings and events will be sent via Advisors' WWPRSD district email and posted as a Discord announcement from Mentors and/or Leaders. Bulletins and a calendar will also be made available on our website ([www.FIRSTrobotics1923.org](http://www.FIRSTrobotics1923.org))

Students are expected to communicate via email and Discord within their subteams and workgroups, as well as communicate to the Advisor when they have an attendance conflict. Clear and effective communication will make our team must more efficient.

### 3.10 What do students gain from FIRST programs?

- The skills of teamwork with peers and adults: Students have the opportunity to work with professionals in engineering and business fields.
- Learning to establish a work with schedule, and finish a project by a deadline.
- Exposure to the fields of engineering, finance, computer technology, and marketing. Most students are not exposed to this in high school!
- Develop leadership, and presentation skills
- Being a team player, as well as an independent problem solver
- Be a role model to elementary and middle school students by getting involved in our other FIRST programs
- The opportunity to share and gain more knowledge in the skills of science and technology
- The opportunity to access all facets of a program that designs, delivers, and uses 'real world' product (the robot) to perform set goals and specifications – FIRST is the closest a student can get to experiencing engineering

- Over \$80 million available in FIRST college scholarships
- A team bonding experience and friendships that last a lifetime

### 3.11 Parental Involvement

Parental involvement is highly encouraged on our team. We need every family to lend a hand and we welcome your support. There are many ways for parents to participate. Here is a brief list of activities where we need volunteers throughout the year:

- Chaperone at competitions
- Bringing food during the build season
- Volunteer at MidKnight Mayhem or other hosted events
- Assist with fundraising & sponsorship connections
- Assist with community education and outreach events

There will be sign-up sheets for parent volunteers for each team activity; we frequently ask for and encourage parents to be involved at additional outreach, fundraising, and team activities.

Should a parent be interested in working as a team volunteer, they will need to be background checked and fingerprinted as any supervisory adult (Advisor, Mentor) would. This includes if parents are interested in chaperoning competitions. Please contact the Advisor if you are interested in lending your skills!

## **SECTION 4: AGREEMENTS**

### **4.1 Transporting Students home from Events**

In order for a parent or guardian to drive their student team member home from an event site, the Advisor must be notified by email at least one week before the event date; **the Advisor must also return the email with an approval and confirmation.** The Advisor cannot release any student who does not have this written notification from the parent before the deadline. Parents who are picking up their students must speak to the Advisor in-person at the event venue before departing.

No parent may transport another student (not their own) from an event without written permission from that student's parents, and returned approval from the Advisor, also within the assigned timeframe.

If there is a team bus secured for an event, students must ride with the team to the event and ride the bus home. Students should plan to attend the entire event, not partial days.

### **4.2 Transportation with Adult Mentors**

Adult mentors may offer to transport students using their personal vehicles, such as carpooling to an event (usually local and off-season events). In such cases, the student is responsible for his/her own safety, well-being, and must be respectful of the parent/mentor's vehicle. A signed Permission to Ride form is required for a trip in a mentor's personal vehicle. All adult mentors who are able to drive students have been thoroughly vetted, including driving record, by the school district.

By signing the handbook, the student and their guardian release adult mentors from liability if an injury occurs and agree to behave appropriately when riding in a mentor's vehicle to ensure everyone's safety.

### **4.3 Publicity & Public Representation**

Students and other personnel associated with the team often take photographs and videos to commemorate our success and preserve team heritage. These photos and videos may be used in media related to the team and/or the school district with the consent of the owners of the media in question.

By signing this handbook, students are giving the team their permission to use any public (where public is defined as the state in which the image or media in question is given to the team or is considered to be the intellectual property of the team as a whole) photographs and/or videos relating to the team within the student's ownership. This permission also extends to the individual's name and comments for press releases and other published media related to WWP

Robotics. Students & parents must also sign a FIRST Mid-Atlantic form and a FIRST form giving FIRST and Team 1923 the right to publish any photograph of the student taken during an event. A student may still participate with 1923 without the FIRST or FMA agreements but will not be allowed to attend any competitions with the team.

All representation of WWP Robotics online & in media will be subject to approval by the Advisor and, as necessary, the school district. No public statements, including social media posts on the team accounts, will be made without express approval by the Advisor.

By signing this handbook the student & parent also agree to adhere to all of WWP Robotics' event behavior rules, and agree to conduct themselves, both in-person and online, in a way that reflects well on the MidKnight family of teams. Failure to do so will result in removal from the team.

**WWP Robotics: FRC Handbook Agreement 2018-2019**

**Please sign & return by October 15<sup>th</sup>**

My child, \_\_\_\_\_ has permission to join as a participant on FIRST Robotics Competition Team 1923: The MidKnight Inventors, and agrees to abide by all the rules and consequences stated in the FRC team handbook.

**I understand that my child’s participation on a WWP Robotics team is a privilege, not a right, and acknowledge that I have spoken with my child about my child’s need to comply with the specific rules and requirements established by this activity.** Students must follow all rules of conduct set forth in the Robotics Handbook, district policies and procedures, as well as state & federal laws.

I understand that my child’s team fee is non-refundable, regardless of my child’s reason for leaving the team or the length of time spent on the team. I acknowledge that this team fee covers membership on the team but not the cost of overnight travel events.

I confirm that I have carefully read the WWP Robotics handbook as well as this form, and agree to its terms knowingly and voluntarily. I also certify that I am the parent or legal guardian of the child specified above.

Signature of Student’s Parent or Legal Guardian

\_\_\_\_\_

Date:\_\_\_\_\_

Signature of Student

\_\_\_\_\_

Date:\_\_\_\_\_