

MOUNTAINEER AREA ROBOTICS (MARS) TEAM 2614 HANDBOOK

Welcome to Mountaineer Area Robotics, team 2614!

This booklet is a general overview of our organization, and what to expect as a member.

TEAM SUMMARY

MARS was founded in 2008 by five students from a former three-time West Virginia state champion FIRST LEGO® League (FLL) team, and two lead mentors, Dr. Earl Scime, and the late Phillip Tucker who regrettably passed away in 2015. MARS is a part of the FIRST Robotics Competition program, or FRC for short.

Since our inception, the team has been quite successful at FRC events, attending the World Championship all but one year of our existence. In 2017, MARS won the World Chairman's Award, becoming a part of the FIRST Hall of Fame and securing a place at the World Championship for 10 years. 97% of MARS graduating seniors have entered post-secondary education programs, many with full or partial scholarships, with more than 80% choosing STEM majors.

The team's primary sponsor is West Virginia University (WVU) which provides access to on-campus facilities at White Hall. We also have critical partnerships with NASA Katherine Johnson IV&V, United Way of Monongalia and Preston County, and numerous organizations both local and national. MARS has a secondary location, fondly referred to as "The Building", where we hold occasional outreach events, drive the robot on the FRC field upstairs, and some of the team practices during build season.

WHAT IS FIRST?

The mission of FIRST (For Inspiration and Recognition of Science and Technology) 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. We do this through building a robot (one per annual season) and partaking in competitions, allowing students to interact with professionals in various fields.

GRACIOUS PROFESSIONALISM

Know and embody this value, as both a member of MARS and the FIRST community. Gracious Professionalism is how we live. The following is an outtake from firstinspires.org:

"Dr. Woodie Flowers, FIRST National Advisor and Pappalardo Professor of Mechanical Engineering, Massachusetts Institute of Technology, coined the term "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.”

QUALIFICATIONS

Qualifications to be a team member are important to ensure the goals and objectives of the team are accomplished with quality and efficiency. These will be taken into consideration during team selection.

Each student is required to complete an application. Please be neat and thorough, as we implement their contents and take prior experience into consideration for training. Take care to see that it is complete. Experience with robotics is NOT required to join the team.

Criteria for Membership on MARS:

1. All Team members will be expected to maintain at least a C average in all courses.

Grades will be checked periodically throughout the year. Any student that falls behind in their studies will not be allowed to travel with the team until their grades are once again at or above a C average.

2. Members should attend as many of the Wednesday team meetings and necessary sub team meetings as possible. Reasonable time conflicts and health concerns will not preclude someone from joining the team. However, if the student cannot participate in most team activities, it is unlikely that the student will be an effective team member.

3. Members must exhibit proper safety procedures. No member may participate in shop or pit activities without developing safe habits. Wearing safety glasses, pulling back hair, and other such behaviors are necessary precautions to prevent accidents, even if they may seem superfluous at times. ALL are responsible for their own mask(s), if necessary. No sharing of safety glasses at MARS. You may take a pair home to sanitize and then label them with your name.

4. Demonstration of Appropriate Behavior. The competition each year is both expensive and time-consuming; it is expected that all involved will behave as motivated young adults with the greatest integrity and regard for others.

5. Consistent Demonstration of Good Judgment and Positive Behavior. Each team member is an ambassador of our team and needs to make proper behavior choices at all times, in and out of MARS activities. **Discrimination with regards to gender, race, culture, sexual orientation, or any personal characteristic is expressly forbidden by MARS.** MARS is an inclusive program and welcomes all students to apply for membership.

a. Willingness and Ability to Commit to a Project

b. Ability to work both independently and as a Team Member

c. Demonstration of Honesty and Integrity

d. Careful planning to make time for the burdensome commitment of the team

Be prepared to make substantial sacrifices of your time in order to attend mandatory events/meetings.

SELECTION PROCESS

We expect that each year there will be more applications than can be accommodated on the team. The process starts with the application. During the months of September and October, applications are available to all students at MARSFIRST.org. **Late applications will not be accepted.** Students who have been on the team for one year *must* reapply for their second year. Students who have been on the team for two years do not need to reapply.

MARS coaches/mentors meet to review applicants and decide who will become official members of MARS. Difficult decisions may be made to create a target team size, but any student who has shown commitment and drive during their time at MARS will likely make the team.

Students selected for the team will be notified by email or in person (often, a team roster is posted in the MARS room). Declined students are encouraged to reapply the following year.

HEALTH AND SAFETY

When working in the shops and during a competition, safety glasses and closed-toed shoes are required. Each team member needs to have a complete medical form on record with the team. You will not be allowed to travel if we do not have your medical form on file. In the event you become ill on a trip, transportation home will be at the parents' expense at the first available opportunity. It is important that you do not travel if you are ill.

COVID-19 RELATED HEALTH AND SAFETY

Anyone experiencing COVID-19 symptoms must stay home and inform Earl Scime for contact tracing if deemed necessary.

FALL TEAM ACTIVITIES

During the fall, team members typically train newer members or improve their own skills in areas of the team. We will also host many outreach events and presentations for sponsors, which are necessary for our team's functioning.

Setting up events like the FLL Scrimmage is also a sizable commitment for the team. This is also a time for students to explore different activities and determine if they resonate with them. We will pay close attention to every student's attendance, volunteering at mandatory events, and overall participation.

FLL EVENTS

Annually, MARS runs an FLL Scrimmage, Qualifier, and the WV State Tournament. Team members are expected to be involved in the construction of the fields and operation of the event including refereeing, judging, emceeing, and working crowd control. Students will assist in the setup on Friday prior to events, and on Saturday, students will be assigned a task for the day. It is important that all students participate in their assigned role for the whole day.

SUB-TEAM AND TEAM COMPOSITION

The MARS team is made of several sub-teams, focusing on both technical and non-technical efforts. The four primary MARS sub-teams are programming, mechanical, electrical, and outreach and public relations. Each sub-team is led by adult and college mentors who guide students to achieve mutual goals. A traditionally five-member Student Leadership Council guides overall team operations, and each sub-team and outreach task force also has a student leader. Furthermore, students from all of these sub-teams and positions join together to form “competition teams” at regional events.

SUB-TEAMS AND THEIR FUNCTIONS

Mechanical Team: This team is in charge of the mechanical aspects of the robot during the build phase, which includes a variety of tasks. The team is split into two primary focuses, machining and assembly. The machining side trains students on the use and safety of various machines such as the mill, lathe, and the CNC mill/router. The assembly side uses items such as bolts, pop rivets, and other materials in order to put together the robot.

Computer-Aided Design Team: The CAD Team uses Autodesk products and Solidworks to create the CAD drawings used to design the robot.

Electrical Team: The Electrical team is in charge of designing power applications and wiring of the robot. They connect all the components to make the robot operate. This team develops the robot’s sensors to interface mechanical and programming tasks. They develop a good understanding of basic circuitry and robot components.

Programming Team: This team is in charge of developing the code for the autonomous and teleoperated functions of the robot. They learn the LabVIEW and Java programming languages during the off-season, and program the robot during build season. They are also involved in the development and workings of various sensors and electronics.

Outreach and Public Relations Team: The OPR team organizes and documents team outreach, and often speaks directly to groups, judges, and the media in order to present our image to the public. This team submits press releases and articles to the local news on a regular basis. Previously, one of the team’s priorities was creating the Chairman’s Award submission, now Impact Award. Since MARS won this award at the World Championship in 2017, they were ineligible for 5 years. Now the team assists with Impact and focuses on other awards.

Media: OPR takes and archives photos and videos of competitions as well as year-round outreach events. They also run the team’s social media accounts, including TikTok, X, Instagram, and Facebook.

Website: It is necessary to create and maintain the MARS website, as well as keep it up to date with the current team information and documentation. The team works year-round to update and improve existing content.

COMPETITION TEAMS

Drive Team: The Drive team consists of a driver, a co-pilot, a human player, a back-coach, a technician, and backup members. The drive team is required to stay with the robot a majority of the time at the competitions.

Scouting Team: Students on this team use various methods to collect data on other teams at competitions, which is used to assess them. This provides the Drive team with as much advantage as possible when choosing alliance members.

Tucker Teams: The Tucker teams are composed of students from assorted sub-teams. These students actively work during FRC competitions to provide other teams with instruction and assistance. They ensure that all teams are playing at their best and serve as our main outreach focus during competitions. This sub-team honors the ideals of our late founding coach, Mr. Phil Tucker.

Pit Crew: The Pit Crew is a small group of students involved in the maintenance of the robot and tools at competition. The pit is essentially our home base, where we keep the robot when not at the playing field. If not assigned to the pit crew or drive team, we ask that you stay out of the pit as much as possible, as there is very limited space to work in (10x10x10ft structure).

Pit Judging: Pit Judging consists of a small group of mainly Non-Technical students who populate the pit during Friday and Saturday of competition. These students are dedicated to sharing the MARS mission, values, and goals with teams and judges alike, and act as representatives for the team.

BUILD/COMPETITION SEASON

Team meetings take place on Wednesdays 4-8 pm.

During the build and competition season, typically from January - April, the team meets additionally on Saturdays from 10 AM - 8 PM or later and Sundays from 12-8 PM. It is understandable that team members may be bound to other extracurricular activities, but it is expected that the necessary amount of time is spent with MARS.

FUNDRAISING

All students are expected to participate in team fundraising activities. The funds raised are used exclusively for student expenses while we are traveling, registration fees, and robot parts. A majority of our funding comes from large corporate or university sponsors, therefore participation in fundraising includes everything from making presentations to corporations and foundations, providing tours to sponsors and potential sponsors, to managing sales of materials online.

E-MAIL

All students are expected to have an active email address and will be added to the team listserv. Any updates and important information will be sent here, so **be sure to check it often**. In the winter, practice cancellations because of snow may also occur. Never feel obligated to personally risk safety in order to attend a meeting. If you do not have access to email for any reason, we can help to resolve this.

COLLEGE & CAREER OPPORTUNITIES

Participation in MARS and FIRST programs is an excellent way to explore careers in STEM, business management, marketing, media productions, and many other fields. In this program, students are exposed to the many principles of FIRST and the hands-on professional experiences of the team's mentors.

There are many scholarship opportunities associated with the FIRST program. The coaches will be providing information regarding these, and there is also information listed at FIRSTInspires.org. By being an eager participant in the FIRST Robotics program, you can qualify for some of the millions of dollars in scholarships given out through colleges and universities in the US and Canada. Most of these become available during 11th grade, but there are several exceptions. Moreover, FIRST is a highly respected organization among top universities in the US and will increase your chances with them.

Scholarship offerings are posted on the FIRST website by September 30, and the deadline for scholarship application submissions is typically early to mid-March. Scholarship contributors select recipients and notify FIRST of the recipient's name and team number. Recipients will be recognized at the FIRST Robotics Competition Championship in late April.

PARENT RESPONSIBILITIES

Parents are an integral part of our team and are very important to our continued success. Parents are also a key factor in the motivation and dedication of their student. Supporting their child in all aspects of their team involvement is key to them getting the most out of the program.

Parents have several responsibilities, they are:

- To provide timely transportation for the student. **Please pick up your student(s) from practice ON TIME.** Mentors who are volunteering their time may have to stay later if your child is left at White Hall past 8:00 pm or the designated pickup time, which is extremely impolite and inconvenient. Ensure that students are at the required events on time, and provide transportation at the designated time upon return from an event.
- Parents are expected to provide transportation to local events and local competitions.
- Parents are expected to provide accurate medical information and to keep coaches informed of all changes.
- Provide adequate funding for their student(s) to purchase food and necessities at events, or ask the team for assistance if this is not possible.
- Parents are encouraged to participate in support of the team through a variety of means. One support method is to provide team meals during the traditional build season. Snacks,

keurig pods and water throughout the year are also helpful. Others include assisting with the supervision of students at distant events, assisting with the preparation of press releases, helping to identify and recruit potential sponsors, and to work towards becoming a team mentor.

TRAVEL

As a team it is very exciting, rewarding, and is often the highlight of a student's memories. A great deal of planning and organization is required to coordinate all the associated activities. A strong effort is made to make the travel an educational experience as well as a competition. Often parents and mentors will transport students to different events. At all times, all persons must wear MARS apparel and stay together in their assigned groups.

EVENT BEHAVIOR

All eyes are on you every minute you are in public, and your behavior is a direct reflection on your character and on our team. We are a very close family when we travel and conflicts may arise as a result. If a problem arises with another student you are to speak to a mentor immediately.

Cooperation: Students are requested to cooperate at all times. This is to mean that if a coach requests you to do something you will comply with the best of your ability. Ignoring the directions or requests of a mentor is not in the team's best interest. If you feel a request is out of order, you are encouraged to complete the task then speak to the mentors at a later, more appropriate time. Disrespect towards any mentor or team member will not be tolerated.

Significant others: In the event that a romantic relationship develops or is ongoing, there are certain guidelines that must be adhered to at all times when engaged in team activities-- both local and away. Couples must stay with a group at all times, they may not wander off alone. They should never appear as a couple (no PDA), but rather as part of the team. The coaches reserve the right to remove members from team activities as necessary for safety and the overall good of the team. The parents will be informed of any such actions as soon as possible.

COMPETITIONS

Typically our team attends two regionals and the World Championship Event. Prior to our arrival, all students will be given a schedule that outlines their responsibilities every hour of the day. All students are expected to follow this schedule as closely as possible.

Most regional events follow a set pattern:

Wednesday (Load-in day): The trailer arrives at the venue and is unpacked by an "Advance Team." Some evening activities may be planned depending on our location and time of arrival. All students should plan to arrive at the hotel no later than 9 pm on this day.

Thursday (Practice Day): The drive team and some of the pit crew arrive at the event early to set up the pits, unpack the robot and start the robot inspection process. The team will have

breakfast together in the hotel. When the team arrives it starts the scouting process and locates a place in the stands. Usually, our robot will practice several times during the afternoon. While waiting for our robot, the pit scouts take pictures of each robot, and scouters in the stands begin reviewing the performance of the other robots. The drive team and pit crew may be required to stay and work on the robot until the pit closes. The remainder of the team will go to dinner as a group if possible. When dinner is done the team will return to the hotel depending on time. A meeting is usually held within the hotel in a meeting room at about 10:00 pm.

Friday (Dress-up Day): In the morning the team will have breakfast together. The entire team will arrive at the competition as soon as the venue is open, typically at 8:00 am. The main team will locate a place in the stands, while the photo and competitive assessment teams work on their assignments. We may have as many as four or five qualification matches on Friday. In order to maintain uniformity, the entire team will wear black dress shirts, black pants, and red bow-ties. The uniform also includes a MARS patch bearing the team logo, a Hall of Fame pin from the current year, and a flying WV.

Saturday (Qualifications and finals): Saturday morning the pits open up at 8:00 am. Upon entering our team again locates a place in the stands. Opening ceremonies start at 9:00 am with the remainder of the qualification matches following. Depending on the format of the competition, the finals likely occur in the early afternoon. The format of these finals varies from year to year. At the conclusion of the competition, there is an award ceremony when any trophies not covered in the opening ceremony are passed out. When this is complete, the team packs up the robot and pit for the return home. This is usually finished around 6-7:00 pm. Due to the distance and the cost of transportation we usually stay Saturday evening. A team dinner will be scheduled at a nearby location.

Sunday (Travel): Sunday morning we may be leaving early depending on transportation availability. A local event will be formatted the same way with the exception of transportation and breakfast.

COMPETITION PROTOCOL

There are certain practices that we find to be very successful and earn us many rewards and the respect of the FIRST community.

Award Ceremony: During the ceremony we will applaud the teams that are winning awards. When we applaud, we will stand to show our respect for what they have accomplished.

Litter: If you see a mess (paper or trash) you should make an effort to pick it up. That goes for the area you are sitting as well as any other location in the arena.

Things not to do at an event: Our team will not engage in negative behavior toward another team/team member or display displeasure over any decision by a referee or judge. Team members will not exchange negative remarks to or about each other, no matter what the situation.

Championship Event:

The championship event is very similar to a regional event in many ways but on a much larger scale. There will be teams from all over the World.

Either **Tuesday** or early **Wednesday** we arrive in the event city. After proceeding to the hotel to drop off our luggage we typically spend the remainder of the day at the event complex.

The advance team loads in the robot and pit area in the early afternoon and gets the hardware ready for competition. Later that evening the pit areas open and the rest of the team arrives to set up the pit structure, engage in practice matches, etc. As always, students will travel in groups at all times, as well as corresponding with assigned mentor groups. Students are expected to be back at the hotel at the predetermined time for a team meeting.

Thursday: morning we have a group breakfast and all proceed to the event. Qualification matches begin first thing in the morning. Button trading, scouting other teams and assorted events occur throughout the day. All team members are required to stay at the event and with the team until released by the coaches. Lunch is available from several vendors for a fee. All team members will be required to be back at the hotel at the predetermined time. Please allow enough time for transportation. There will be a team meeting at a specified location and time. Typically we have a meeting every evening to recap the events of the day.

Friday: will start with opening ceremonies in the main arena, followed by the seeding matches. We will usually get three or four matches that are spread throughout the day. This is also the day when the judges will begin to make their rounds to each team. The scouting team will meet back at the hotel to complete competitive assessment materials in preparation for the competition on Saturday. Students will be required to be back at the hotel at the predetermined time. There will be a team meeting at a specified location and time.

Saturday: After breakfast as a group, we will proceed to the competition as soon as the pits open. At 9:00 am there will be another opening ceremony. You will not want to miss this event. We will sit together as a team. The seeding rounds continue until about noon. Depending on the configuration of the competition, the finals will be held in the afternoon. Following the last matches, the award ceremony starts. This ceremony takes about 1½ hours. The team will sit together for the duration of the ceremonies. Following the round-robin, the finals matches will be played..

HOTEL

When we travel we often stay at a hotel for several nights. Students will be organized into room groups of either three or four students, depending on the number of students and room availability. Students may be allowed to suggest roommates, there are no co-ed rooms; rooms are either male or female. Often there is free time in the hotel to get snacks, play in the game room or swim. If there is a pool a mentor must be present to swim or use the hot tub. Appropriate attire is required. Please check with a mentor if there is any question. There is a mandatory curfew to be in your rooms by 10 pm unless you have explicit permission from or are supervised by a mentor, **parental supervision is not an acceptable substitute.**

We have a complete Travel Handbook detailing these rules more thoroughly that will be distributed during the travel season.