Armada Robotics
FRC 2508
Rookie Handbook

Table of Contents

Overview

Introduction

Welcome aboard *FIRST* Robotics Team 2508, Armada Robotics! We always welcome new members and will do our best to steer you on course to becoming a valued member of the Armada and beyond! This packet will introduce the expectations, policies, and goals of Team 2508. Aligning your goals with the goals of the team is of paramount importance to the success of the team as a whole. Communication is essential and allows us to effectively work as a team. This is the sole purpose of leadership meetings, to have time to discuss plans for the subsequent meeting, and to maximize the productivity of the team.

By showing your dedication and commitment to this team, you are not only allowing future students to succeed but also acquiring valuable skills through this process. While designing, building, programming, and driving robots can be gratifying, it is the underlying principles learned along the way that is empowering and is what makes *FIRST* a unique opportunity.

Our Mission

The mission of Armada Robotics is to offer students the opportunity to gain leadership skills, experience, and learn real-world techniques to creatively meet an engineering challenge with the help of experienced mentors. The team fosters a cooperative environment dedicated to the growth of all members and mentors as well as the community and other *FIRST* teams-all while having fun.

About Us

Armada Robotics was founded in 2008 by eight High School students fascinated by a robotics competition called "*FIRST* Overdrive". As one of the many *FIRST* robotics teams founded in 2008, we attended the first-ever regional held in Minnesota. Originally named "The Widgets", the name was dropped after the first year of competition and the team was renamed "Armada". In 2012, Team 2508 won the first-ever Minnesota State High School League *FIRST* Robotics Competition with team 3883 the Data Bits and Team 2169 King TeC. We have been competing ever since and strive to improve our team each year.

FIRST Robotics Competition

The *FIRST* Robotics Competition(FRC) is a high school level robotics competition in which teams from around the world create robots to score points in a challenge that changes from year to year referred to as the "game". The game is released at "kickoff" during the month of January. A small group of students will also travel to watch the kickoff live stream in an auditorium and pick up our Kit of Parts(KOP) which are materials that *FIRST* gives us. The time before kickoff and after the season ends is referred to as the "off-season". During the off-season we are not building a competition robot, so we learn skills that will help us in "build-season" which follows kickoff.

Joining the Team

Team Dues

There are two fees associated with joining the team, the first of which is the fee to use the FeePay™ necessary to register for the team. Unfortunately, this is mandatory for all clubs and sports, although the fee is only paid once and is not dependent on the number of clubs and sports the student joins. The other fee is for buying a T-shirt. All team members are expected to have T-shirts and they are relatively inexpensive. In addition, any team member who meets the criteria and wishes to attend a remote competition is required to pay a fee to cover hotel costs. Scholarships and financial aid are available upon request for eligible members.

Meetings

During the off-season, we meet on Thursdays from 2:10-4:30. During the build season, we meet every day starting at 2:10 although the end time varies each day. Our season roughly progresses as follows: We begin by brainstorming ideas specific to the game. Next, we use computer-aided design (CAD) to design all of the needed mechanisms for the robot to function. As we finish designing parts, we manufacture and test them. We then begin iterating through our designs and modify them as necessary. Once we finish building, we focus on programming, though, during the build season, the programming team attempts to program as much as possible without a physical robot. Each year we have six weeks to build a functional robot before the first week of competitions start.

Every fall we also compete with the previous year's robot in what are called "off-season" competitions. These are competitions hosted by other schools to allow potential drivers to practice, test new features on your robot, expose new members to what a competition is like, and simply have fun.

Expectations

General

All members are expected to take an active role on the team. This includes completing projects assigned to them by their respective subteam lead to the best of their ability, asking for help if needed. If they do not have a task they should check Trello or ask their respective subteam lead. Members should not be off-task for long periods of time or take other members off task. All team members should have an account on our Slack workspace and use this method of communication to stay informed and updated. All of the required paperwork should be completed at the announced deadline.

Gracious Professionalism

Gracious Professionalism is "a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community." All students on the team will be expected to display Gracious Professionalism and practice the core values of *FIRST*. Each team member should act in a supportive and respectful manner, encourage other teammates, and come to meetings with a positive attitude. The concept of gracious professionalism combines competition and kindness.

Remote Competitions

Team members who wish to attend remote competitions must have at least 200 recorded build season hours and have attended a minimum of 30 days during build season. Any member who wishes to attend a remote competition must let a member of the leadership team know.

Local Competitions

Team members who wish to attend local competitions must have at least 40 recorded build season hours and have attended a minimum of 10 days during build season.

Lettering

Any member of the team can also letter by tracking their hours throughout the build season. A threshold for the number of hours required to letter will be established by the leadership team. Each team member is required to track their hours on a sign-in sheet in the robotics lab.

Safety

The Importance of Safety

Safety is a significant part of Team 2508 and *FIRST* as a whole. Instilling safe habits and practices is a core value of *FIRST* and we believe it is of critical importance. Students are responsible for creating and maintaining a safe work environment, participating in safety training, and following all safety precautions.

Safety Program

Our safety program includes both annual safety training and an exam to check comprehension of the material. All members are required to complete these safety requirements. The safety captain will give safety demonstrations, provide a slideshow that covers all the information as well as a safety manual, and administer the safety exam.

Safety Exam

As a member of Team 2508, you must pass a short safety exam. It will be 25 questions, all of which will be multiple choice. To pass you must receive a score of 90% or greater. If you do not pass, you will be required to further review the safety guidelines followed by retaking the test to confirm your understanding of them.

Organization

Subteams

Tasks that the team has to complete are organized into subteams which are groups of students that excel in a particular skill set. Students are organized into subteams at the beginning of the year, and although students can be, and are often a part of multiple subteams, it is advised that members pick a particular subteam to devote most of their energy to. This model of specialization is helpful to the team, as it allows the team to become well rounded while students may become more specialized. Each subteam has a respective subteam "lead" which leads that subteam. At 2508 we have 3 subteams which are Programming, Mechanical, and Business. In addition to joining a subteam, every student helps to design, build, and assemble the year's robot. Subteams may also be organized into smaller groups yet. For example, Mechanical is divided into CAD, electrical, plumbing, etc.

Trello

Trello is the main organizational system we use to keep track of our tasks during the build season. Each subteam has its own Trello board and organizes the board using lists to indicate the progress of the item or task(represented by a card). Team members will use Trello to check the status of projects and change the status of projects as they move through different design and manufacturing phases.

Slack

All team members are also expected to use Slack. Slack is used as the primary form of communication and **it is strongly advised that all team members have notifications turned on for Slack.** Team meetings and any changes in schedule will be distributed through our Slack workspace.

Competition

Layout

Regional competitions have two main parts. The first of the two parts is the pits, which is where teams work on their robots and store their supplies. As a result, safety glasses are mandatory in this area. Each team is given a 10'x10'x10' area to store tools, equipment, their robot, and other materials they wish to have access to throughout the duration of the competition. The other main part of the competition is the arena. This is where robots compete, and as it is critical to keep on schedule, only certain individuals are allowed onto the field to reduce crowding and delays.

Structure

The duration of regional competitions is three days: Thursday, Friday, and Saturday. Teams are also allowed to drop items off on Wednesday and send 5 students and 1 mentor into the pits to set up their pit area. The first day(Thursday) consists of practice matches that allow teams to work out bugs with their robot and fine-tune components and/or mechanisms on their robot. During matches, each team plays with 2 other teams, facing another 3 teams in a 3v3 match style. On the second day of competition, practice matches are concluded and qualification matches start. The match schedule is generated live at the event, and as such, there is no way to know it before the event. In matches, there are certain objectives that allow teams to gain Ranking Points(RP). RPs are used to rank teams, and an average number of RPs per

match is calculated after each match. Each team plays about 10 qualification matches to determine their rank. At the end of these qualification matches, alliance selection begins. Alliance selection is where the top 8 ranked teams(based on RP) determine what other 2 teams they want on their 3 team alliance going into the playoffs, which is a typical single-elimination structure based on a best of 3 matches. Any team that picks the first team on their alliance is called an alliance captain. Alliance selection is done on the field. If one alliance captain chooses another, every team below the chosen captain moves up one spot, and the highest rank team that is not on the field enters the field(e.g. #1 ranked team picks the #2 ranked team and every team moves up one, then the #9 ranked team moves up onto the field). Any team that is invited has the choice to accept or decline the invitation to join another team's alliance. If they decline, no other team is allowed to invite that team to their alliance. This means that the only way they are allowed into the playoffs is as their own alliance captain. The #1 seed picks first, then #2, then #3, etc. Then, after the #8 seed has picked, the #8 seed picks another team, then the #7 seed picks, then #6, etc. This means that if a team declines an invitation and they are not on the field at by time that the #8 seed picks, they will not advance to the playoffs.

Competition Roles

Our team roles will change during the competition as we will not be organized by subteams. One team member will be assigned the role of Safety Captain and will have certain responsibilities such as attending daily meetings on competition days and filling out forms at the end of each day. Team competition roles will be predetermined before the competition date.

Several members will be designated to "scout". Scouting is the process of observing and collecting information about other teams and their robots. This involves both interviewing teams about their robots in the pits and recording their robot's performance during matches. This is crucial for alliance selection to playoffs, as it allows you to choose a robot that compliments your own robot.

In addition, several team members will be chosen to operate the robot. These members are part of the "drive team". There are 5 members of the drive team. The first is the drive, who is responsible for driving the robot. The second is the operator who is responsible for operating the end effector and superstructure of the robot. The third is the drive coach who is responsible for coaching both the driver and operator but is not allowed to directly interface with the controls. The fourth member of the drive team is the human player whose role changes between games. The final member of the drive team is the technician who is responsible for resolving unexpected situations and managing the robot cart.

Additional Resources

There are additional handbooks specific to each subteam that can be found using the links below

Mechanical

Programming

Business

In addition, there is a build handbook for all team members

Build

Required Paperwork

FeePay™

All students on the team are required to register on the FeePay™ system provided by Stillwater Area Schools.

FIRST Consent Form

All students on the team must complete a *FIRST* Consent and Release Form. Any student who does not complete a FIRST Consent and Release Form will not be allowed to attend any competitions. This form can be completed electronically after signing up for an account, and instructions on how to do so can be found here.

Student Contract

- I agree and consent to allow my photographs, name, or comments to appear in media related to Team 2508.

- I have read the handbook describing Team 2508 - Armada Robotics and agree to comply with the policies outlined within.

- The equipment used during the construction of the robot can cause serious harm injury if not used correctly. I understand that members are not permitted to use any piece of equipment until they have been instructed on its safe use and are not permitted to use any piece of power equipment without adult supervision.

Print Student Name Student ID

Student Signature Date

Parent Signature Date

Glossary

Term	Definition
Alliance	A cooperative of typically 3 *FIRST* Robotics Competition teams (up to 4 at Championships or if a backup team is used)
Alliance Captain	Any team who chooses the first team to be on their alliance in playoffs
Alliance Selection	A process by which alliance captains choose their alliance for playoffs
Arena	Where robots compete at the competition
Autonomous	The first period of the match where robots run pre-programmed code that allows them to navigate the field
Blue Banner	A banner awarded to teams for certain awards or for winning an event
Build-Season	The time after kickoff and before competitions
Button Board	A board used by the operator to control mechanisms on the robot
CAD	Computer Aided Design is an umbrella term for design software
CAM	Computer Aided Machining is the process of readying a part for manufacturing
Chairman's Award	An award that is given to one team at each regional event where teams submit a video, essay, and give a presentation about their team and show how they have impacted their community

Champs / Championships	The World Championships, all winners of regional events and district events advance to Champs
Chief Delphi	An unofficial *FIRST* Forum
DPR	Defensive Power Ranking is an estimation of how much defense a team played
DQ	Disqualified
Defense	Preventing another team from completing point-scoring objectives
Drive Coach	The Drive Coach is responsible for coaching the drive team during the match, this can be a mentor or a student
Drive Team	A group of individuals designated to operate the robot during competition
Driver	A member of the drive team designated to drive the robot
EI	The Engineering Inspiration Award "Celebrates outstanding success in advancing respect and appreciation for engineering within a team's school or organization and community."
Endgame	The final 30 seconds of the match
FIRST	*FIRST* stands forFor Inspiration and Recognition of Science and Technology and is a global robotics community preparing young people for the future and the world's leading youth-serving nonprofit advancing STEM education
FLLC	*FIRST* Lego League Challenge is a robotics competition organized by *FIRST* for ages 9-14 in the US/Canada and 9-16 elsewhere
FLLE	*FIRST* Lego League Explore is a robotics competition organized by *FIRST* for ages 6-10
FRC	*FIRST* Robotics Competition is a high school robotics competition organized by *FIRST*

FTA	The *FIRST* Technical Advisor is responsible for managing the FMS and related systems
FTAA	*FIRST* Technical Advisor Assistants assist the FTA
FTC	*FIRST* Tech Challenge a robotics competition organized by *FIRST* for grades 7-12
Field	Where the game is played
Field Reset	Volunteers that reset the field after a match
Foul	If a foul is called points are awarded to the opposing alliance
Gracious Professionalism	The "Ethos" of *FIRST*
HOF	The *FIRST* Hall of Fame is a list of role model teams determined by who wins the chairman's award at championships and are allowed to attend championships every year
Human Player	The Human player is a member of the drive team although their exact role is dependent on the game
Inspection	All robots must be inspected by a certified robot inspector to compete in qualification matches
Judges	Volunteers with blue polo shirts that hand out awards
Kickoff	An event held early in January to announce the game and distribute kits to each of the teams
Kit of Parts	A kit received on kickoff provided by *FIRST* that contains parts that can be used throughout the season
MC/EMCEE	Master of Ceremonies, the official host of the event
Match Schedule	The order in which matches will be played, generated live at the competition
OPR	Offensive Power Ranking is an estimation of how much a team contributes to their alliance's points
Off-Season	The time before kickoff and after competitions

Offense	Completing objectives for your alliance
Operator	A member of the drive team designated to operate the end effector or superstructure of the robot
Pits	Where robots are worked on at the competition
Playoffs	Matches after alliance selection where a best of 3 single elimination bracket is played
Practice Matches	Matches played before qualification matches to work out bugs before qualification matches start
Qualification Matches	Matches which determine a team's rank based on their average ranking point score
Queue	Where robots wait before a match starts
Red Card	A red card is waved by a referee and signals the disqualification of a team
Referee	A volunteer who is certified by *FIRST* to enforce the rules of the game(White and Black Striped Shirts)
Robot Inspector	Robots must be inspected before they can play in qualification matches, this individual is a volunteer certified to inspect robots and wears a bright yellow hat
Rookie Member	A first-year member
Rookie Team	A first-year team
Sponsor	An entity(often a company or corporation) who has supported a team monetarily, with parts, or otherwise
TBA	The Blue Alliance is a website that displays information about FRC Teams, *FIRST* Events, Matches, etc.
Tech Foul	Similar to a foul, may have a different point value awarded
Technician	A member of the drive team who is designated to resolve problems related to the robot
Teleop	The TeleOperated or driver-controlled portion of the match where humans control their respective robots
Veteran Member	A member who has competed for 2+ years

Veteran Team	A team who has competed for 2+ years
Volunteer	Someone who volunteers their time at a *FIRST* event to keep the event running(e.g. Robot Inspector, Referee, FTA, etc.)
WFA	Woodie Flower Award, An award given to mentors each year to recognize their outstanding effort to promote the ideals of *FIRST*
Yellow Card	A yellow card is waved by a referee, this card is a warning and does not have any initial consequences but is the equivalent of a red card if repeated, yellow cards are reset after practice matches, qualification matches, and the ends of events