

BOW Community Robotics

FIRST Robotics Competition (FRC)  
Team 4290 - “Bots on Wheels”



# TEAM HANDBOOK

2022 - 2023 Season

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## STUDENT APPLICATION

Welcome

Forms are Electronic

### Revision History

<b>Date</b>	<b>Revised By</b>	<b>Revisions</b>
<b>8/2017</b>	<b>C. Carlson</b>	<b>Season dates updated to 2017-2018 Add Consent Forms Updated Team History Changed Junior Members to Youth Mentors Add new changes regarding student commitment Add GroupMe communication guidelines Updated address of QCRA Zone</b>
<b>4/2018</b>	<b>C. Carlson</b>	<b>Season date updated to 2018 – 2019 Update Team History Update Application to include demographics information and uniform sizes Added meeting requirements in section 5.2 Updated section 11.3 to include volunteering as an ambassador at competitions</b>
<b>12/2018</b>	<b>C. Carlson</b>	<b>Update to change team name from Bots of War to Bots on Wheels</b>
<b>5/2019</b>	<b>C. Carlson</b>	<b>Season dates updated to 2019-2020 Update Team History Removed Student Application and added electronic forms Communication use Team App Remove GroupMe as communication app</b>
<b>5/2020</b>	<b>C. Carlson</b>	<b>Season dates updated to 2020-2021 Updated Team History Updated Participation Fee information Updated link to Student Application</b>
<b>8/2020</b>	<b>C. Carlson</b>	<b>Updated Participation Fee Information Updated Competition to say held second or third week of April</b>
<b>2/14/2022</b>	<b>C. Carlson</b>	<b>Updated Logo</b>
<b>6/7/2022</b>	<b>C. Carlson</b>	<b>Update year, correct formatting, Time commitment to the team, required hours, retire Team App. Using google calendar for meeting invites. Add discord as a communication app. Added excused absence policy</b>

# **1.0 Welcome to BOW Community Robotics**

*Congratulations on deciding to join BOW Community Robotics FIRST Robotics Team 4290. This guide provides an understanding of the program and responsibilities of team members, including information relating to team history, membership requirements, team structure, parent participation, team rules and guidelines, competition events, travel and other central aspects of the team.*

*This handbook was modified from the handbooks developed by BOW Community Robotics FIRST robotics team 4290 and Tualatin High School FIRST robotics team 2002. It is intended to provide you and your family with information about the program and your responsibilities as a team member. Please read it carefully and share the information with your parents/guardians.*

*Just as all of a robot's parts work toward a common functional goal, members of our team have shared goals as well. Knowledge of the information in the handbook will enable our team to work as a unit. FIRST, "For Inspiration and Recognition in Science and Technology," provides opportunities for building robots, sharing information with other teams around the world, competing at a high but cooperative level, and inspiring others to enjoy science and technology. Welcome to an exceptional opportunity to create, build and learn. Find more information at [www.bow4290.org](http://www.bow4290.org).*

## **2.0 History**

Team 4290 started in the fall of 2011 as a small but inspired group of students under the mentorship of Phillip O. Berry Academy of Technology's technology teacher, Mr. Clyde Valentine. The team began meeting after school for approximately 3 hours each week. Using a variety of robot parts and subsystems from the school's engineering academy, team members were able to gain valuable experience in the many areas of robotics.

By the time of the 2012 build season, our team had coalesced to a core of about 12 students and 5 adult mentors and received corporate grants from ITT Tech, Livingston and Haven and Siemens. Unfortunately, due to logistics and the death of Mr. Valentine the team was unable to participate in the 2012 game season.

In 2013, our first-year as a FRC competition team we traveled to Dorton Arena, located in Raleigh North Carolina, to participate in the North Carolina Regional FRC tournament. We brought home the Judges Award and students who were engaged and motivated to achieve, learn and collaborate.

During the summer of 2013 the team became a community robotics team with membership open to all area high school students interested in First Robotics. The team ramped up its community outreach participating in K12 Open houses, community festivals and events, teaming with Discovery Place to mentor students at First Ward Elementary School, hosting the FIRST Lego League (FLL), District Tournaments and much more.

In 2014 the BOW Community Robotics FRC Team relocated to 2xSALT Community Center, Charlotte, North Carolina.

In 2015, the team relocated again to the FIRST Zone located at 5800-A Tunnel Road, Charlotte, North Carolina 28208.

Team 4290 traveled to McLeansville, North Carolina and won the 2016 North Carolina FRC Guilford District event. We ranked 7<sup>th</sup> among 75 teams heading into the NC State Championship. We received an opportunity to compete at the FIRST World Championships in April in St. Louis, MO. An inspiring trip to St. Louis energized Team 4290 to strive for tremendous team experiences on and off of the competition field.

In 2016, the team membership grew to 30 Students, 5 Youth Mentors and 11 Adult Mentors. Team 4290 had a successful season. We were the winning team/alliance at the first district competition Winterville, NC, ranked fourth overall at the district competition UNC-Asheville, Asheville, NC, qualified for state competition

held at Campbell University, Buies Creek, NC. and were the winning team/alliance at THOR (Thundering Herd of Robots), an off-season competition at the University of North Carolina Pembroke.

Due to funding QCRA had to close the zone at the end of the 2016 - 2017 season. During the off-season QCRA found a new home which is located at 900 Pressley Road, Charlotte, North Carolina 28217. Plans were made to move-in during Labor Day weekend.

Our 2017 - 2018 season started by moving into a new workspace that is shared by other QCRA teams. We welcomed a few new mentors and youth team members, some of which transferred from other FRC teams and a few team members left to pursue other goals.

Our competition season began at UNC Pembroke. We ranked fourteen overall and competed in the finals with the fifth Alliance Captain team 5160 and 6500. We also competed at Winston-Salem State University in the finals with the 2nd Alliance teams 4759 and 2640 where we finished in second place. Our FIRST North Carolina ranking was fourteen which qualified us to advance to state competition. State competitions are held at Campbell University, Buies Creek, NC Our team was the fifth alliance captain with teams 2682 and 6500. Our team received the "Hard Hat" pin for Safety at District Competition Winston-Salem and State Championship.

Another important item to note is that our team applied for and received approval for our own non-profit status.

Our 2018 - 2019 season has been an amazing experience to say the least. Here is how the season went.... We started off with three returning veterans and seven new students as we had twelve graduating seniors from the previous season who are now attending local community colleges and universities like CPCC, NC State, UNC Charlotte, and AT&T. Our alumni have come back to visit providing encouragement, knowledge to our new team members and volunteering at district competitions.

In late December 2018, the team made the decision to change our name to better represent who our team is today. Our new name "Bots on Wheels" has helped us to secure new sponsors, mentors and keep our team membership.

Our season was interesting, we ranked 19th place and were a member of the 4th alliance with teams 7763 and 6565 and won the Imagery Award in honor of Jack Kamen at Guilford competition. Next, we attended UNC Asheville which is now our "Home" event. We ranked 9th place, and were the 7th alliance captain with teams 6932 and 6908. We advanced to State Competition at Campbell University, were selected as a member of the 1st place alliance with team 1533 and 5190. YES!! Our alliance won the FIRST North Carolina State Championship and we are State Champions!!!

Winning State Championships advanced us to "Worlds" held in Houston, TX. Fifteen of seventy North Carolina teams advanced to the Houston FIRST Championship. We were assigned to the Carver Division. Our overall ranking was 27 out of 68 teams in the Carver Sub-division. We attended a pizza party held by Qualcomm where some of our students talked with Don Bossi and Qualcomm representatives. There was a huge 80's theme party in the park with arcade games, spirograph, light bright, karaoke, skating, music, and lots of food trucks. Let's not forget about our new friends the Jag-Wires that helped us to get to Houston.

Our goal continues to be an inspiration in the fields of science and technology, with a focus on engineering skills, teamwork, and leadership training. Our team welcomes students from all area high schools, charter schools, private schools and homeschool students.

## **3.0 Administrative Notes**

The FRC team is associated with the Queen City Robotics Alliance (QCRA) and hosted at the FIRST Zone. We have a limited student capacity. That said, the team is open to any high school student provided space is available; however, students outside of the Charlotte-Mecklenburg metropolitan area will need greater parental involvement. The majority of the team's funding comes from local business sponsors. An FRC team costs between \$30,000-\$45,000 per competition season. Due to the location of the FIRST Zone and coordination with the QCRA, the majority of the team will be comprised of Charlotte area students.

All student participants in the program will need consent from their parents or guardian and pay a non-refundable participation fee. The primary purpose of the participation fee is to ensure a minimum level of commitment to the team. The participation fee is tax-deductible, and will only be used for FRC team expenses.

## **4.0 Membership**

Unlike most Varsity team activities at district High Schools, Team 4290 has no tryouts or entrance requirements. BOW Community Robotics is an open team, welcoming all who wish to participate. The wide variety of experiences and opportunities offers students the chance to find her/his niche in the team.

While there are no prerequisites for joining the team, Team 4290 has standards of participation and behavior that are necessary for the success of each member and for the team as a whole. Meeting these standards provides individuals the opportunity for the privileges of leadership positions, travel opportunities, and recommendations for possible scholarships.

### **4.1 Criteria for Membership on Team 4290**

- 1. Members must maintain academic eligibility.** BOW Community Robotics rules require that all team members maintain good academic standing. Students must be aware that falling into Academic Probation will mandate a loss of eligibility to be on the team. During the build season in January and February, team members must maintain a minimum average of 70 in each class. Any student whose average drops below this minimum must conference with mentors during a two-week probationary period, after which time an evaluation of further participation will be made.
- 2. Members attend meetings during non-build season whenever possible, a majority of the build sessions during build season, and team functions as necessary.** Team 4290 participates in skill development programs and outreach events throughout the year. With the understanding that bright students often have varied interests and commitments, team members stay informed of team events and participate as much as possible. Establishing a record of dependability and punctuality is essential for team organization and efficiency.
- 3. Parents of members are encouraged to participate actively in team activities and help in team operations.** Without the participation of generous and experienced team parents, members are well aware that opportunities would be very limited. Appreciation and respect for these volunteers is central to Team 4290.
- 4. All members must take the Team Safety course.** The Machine Shop Safety Course is the foremost activity for each member before using the shop. Each sub-team will outline the steps to prevent accidents to individuals, equipment, or facilities. No member can participate in shop or pit activities without taking this orientation.
- 5. Members Must Demonstrate Appropriate Character/Behavior.** All members of Team 4290 rely on each other for the success of the group. Everyone is expected to bring the best of his/her abilities to the group. The competitions are mentally and physically demanding, time consuming and expensive; all involved should behave as motivated young adults with integrity and the greatest regard for others. Members should demonstrate the following attributes:

- **Good Judgment and Positive Behavior:** Each team member is an ambassador of our team, school and sponsors to the rest of our school(s) and the community at large. Team members are role models for other students to emulate and respect. Mature behavior, including dedication, competence, patience, and leadership, should be demonstrated both in and out of school activities.
- **Ability to Commit to a Project:** Starting a project and following it through to the end is critical to team success. Team members need to dedicate themselves and not get sidetracked or discouraged. Your word is very important. *Don't take on a responsibility you can't perform. Ask for help if you are having problems with a project.*
- **Ability to Work Both Independently and as a Team Member:** Being able to be a team player, or *doing what is needed for the team*, is an asset to all. However, working independently when necessary shows dedication and willingness to learn.
- **Demonstration of Honesty and Integrity:** Honesty and integrity are foundational attributes of a quality person. Our teamwork depends on the integrity of its members the way a robot depends on the integrity of its parts. Integrity includes knowing what a person believes in as well as leading in word and deed.
- **Time to Spend on Activities:** This team requires many hours of a student's time. Careful planning and scheduling are required to stay actively involved.
- **Respect for the Work Areas:** All students participate in keeping the work areas clean and organized as they work, and in particular, at the close of each workday. This is critical for safety and shows respect for the fact that this is space donated to us. It is respectful to our mentors to own the responsibility of keeping the workspace clean.
- **Appropriate attire:** Proper clothing should be worn for safety purposes and out of respect for team participation.
- **Appropriate focus:** As membership on a robotics team involves a great investment of energy, skill, money, thought, cooperation, and time from people at so many levels, team members should participate with good focus. Attention to the task at hand is essential for safety and success in our goals. At events and in the workshop, members should avoid distractions that can compromise both team goals and opportunities for personal growth in the field of technology.

#### 4.2 Youth Mentors Team Members:

A limited number of youth mentors (ages 18 - 21) will be allowed to participate each year as determined by the lead mentor. Students wishing to join in this youth mentor program should apply with the Lead Mentor, who will determine space availability for each season. Youth mentors have a serious work ethic, a desire to experience aspects of engineering, intentions to participate on Team 4290, and the maturity to work independently. As the demands and responsibilities of FIRST challenges are extensive, some limitations may apply to this youth mentor program.

## 5.0 Team Structure

### 5.1 Student Team Members

Members of the team participate in areas that interest them. For those with the desire and aptitude, there are positions open for individual students to demonstrate and enhance leadership skills. Students who wish to be considered for these positions are typically veteran members with at least a year's experience on the team.

## Team Leadership Council

Each of the sub-teams has one mentor-appointed sub-team lead and an assistant leader who manages his/her responsibilities when the lead is unavailable. The Team Leadership Council is made up of the leads from the sub-teams listed below. Sub-team Leaders recruit and train new members, organize and hold safety training sessions, keep their sub-team members on track during build season, and communicate the sub-team status and needs to the team leads and mentors. The sub-team leads excel at the criteria for membership stated in the previous section.

**Sub-Teams:** Team 4290 is made of several Sub-teams that coordinate throughout the year. By dividing into specialized groups students are able to focus on specific goals of FIRST. Students may participate in both technology and outreach teams, the two categories of sub-teams. All students participate in outreach teams for at least the predetermined number of hours each year. This participation furthers the goal of sharing the appreciation for science and technology, which is the reason we exist. As seasons vary according to the demands of the challenges put forward by FIRST, our structure is organized but also fluid enough to adjust to new requirements. The following is a list of many but not all of the sub-teams.

**Mechanical Teams (3):** These teams fabricate and assemble the robot during the build phase. The jobs vary depending on the direction of the mechanical mentors and the abilities of the students. They are ready to make revisions and repairs at competitions and throughout the season. **There are typically three teams, Drive-base Team and two Mechanical.**

**Specialty Teams.** Each team will help CAD its own portion of the robot. CAD members electronically draw each part of the robot during the design phase of the build season, so that all parts are documented and reproducible. Each of these three teams has a sub-team leader on the Team Leadership Council.

Electrical Team This team coordinates the wiring of the robot, including all power and communication systems.

Programming Team This team works on the design and construction of the control panel, and develops the Java-based software necessary to drive the robot in both autonomous and teleoperated modes.

Design Team The Design Team develops strategies and robot designs. They research other team ideas by participating in web forums (such as ChiefDelphi). They develop 3 dimensional models of the robot using tools based on robot strategies and prototyping efforts.

**Business Team** The Business Team develops relationships with local businesses for sponsorships, as well as handles all fundraising activities that keep the team building. From press releases to sponsor letters to information brochures, this team promotes the visible face of the BOW Community Robotics. Additionally, they set up the structure of Team 4290, streamlining the numerous areas that FIRST requires. While they focus on funding the team, their communication skills keep our goals organized, greased and running. This team works closely with the Outreach Team to coordinate events and promote technology, as the more our sponsors share our belief in what we do, the more enthusiastic is their response.

**Logistics Team** This team coordinates travel plans for competitions and meals during build season. Members make sure homework time is a priority, even during build season. They encourage good grades as a standard for our team, acknowledging that FIRST complements education.

**Outreach Team** The major task for this team is coordinating outreach events that share the knowledge and joy for science and technology, and then coordinating the participation of all members of Team 4290. Our major events include the FLL Tournament and service projects under our heading Queen City Robotics Alliance. Several other events, including working with FTC and



FLL teams and local schools, also are part of our annual agenda. This team writes submissions for the various awards, such as the **Chairman's Award** and Woodie Flowers Award. During competition, this team often speaks directly to groups, judges, and the media, and is typically stationed outside the pit area to greet other team members. The team builds the visual archive of various aspects of the season. They take photographs and or video clips for such things as our website, scrapbook, trading cards, training videos, strategy evaluations, and other instances where a video record is useful or necessary. Members develop many sections of the website, bow4290.org.

## 5.2 Student Time Commitment

One commitment to the team is that of time. Time commitments on average is as follows:

### ***During the "Pre--season" (May – December):***

Training Sessions, as required; Pre-season training will be provided to the team – **minimum of one day per week, three hour minimum.** There may be additional meetings on Saturdays and/or during the week for other fundraising or special event days.

#### **Minimum Hours: 3 Hours Weekly**

Hours available: 8 Hours

Week Day: 1 meetings (6-9PM = 3 Hours)

Weekend Days: There may be additional meetings on Saturdays and/or during the week for other fundraising or special event days.

#### **Additional Requirements:**

Must attend safety training

Pass safety test 100%

Attend a minimum of 6 hours for outreach events

Fundraising opportunities are available for team members to raise funds towards their team contribution(Fundraising Goal).

### ***During the "Build--season": (January-April)***

The build season is an intense and exciting period when all teams have been informed of the competition objectives and must complete their robot design and construction prior to their first competition. The frequency of meetings during this period will increase as needed to complete the job on time.

#### **Minimum Hours: 14 Hours weekly**

Hours available: 18 Hours

Week Days 3 meetings (6-9PM = 3 Hours) for a total of 9 hours

Weekend Days 1 meeting (9-6PM = 9 Hours) **\*Time is subject to change**

#### **Additional Requirements:**

Must attend Kickoff

Attend Design Meetings

Team hours worked qualify as CMS required internship hours

#### ***Excused Absence:***

Team Members **MUST** notify Lead Mentors, Cindy and/or Bart Carlson when you will be using an excused absence..

**During Season (January - April):**

Team Members will receive 3 days "Excused Absence"

For the following: Family Events, Family Emergencies, Sick Days, Exams

**During Pre-Season (May-December):**

BOW is flexible during this time of year due to summer vacations, other commitments outside of the team and holidays.

**Tracking Hours Worked:**

Team Members are responsible for signing in and out for all hours worked. These hours will be tracked through a google form. Lead Mentor(s) and/or coach will check at regular intervals to ensure that team members are committing an appropriate amount of time.

**Scheduled Meetings, Fundraisers, and Outreach events:**

Team members are expected to remain at the meeting(s) and event(s) for the entire time.

**Example:** Meetings are scheduled from 6pm to 7pm students should not leave prior to the scheduled end of meeting time regardless if their ride arrives earlier. All students are to remain until the area has been cleaned-up (tools put back in their proper place and floors vacuumed/swept) and dismissed by mentor or coach.

If there are extenuating circumstances, the student must discuss it with the Lead Mentor(s) first.

## 5.3 Adult Mentors

The growth and education of Team 4290 depends largely upon adult team members. Typically, the adults are teachers, parents of students, and interested members of the community.

### Lead Mentor

The team's Lead Mentor is the primary lead between the team, parents, sponsors and schools. The Lead Mentor reports directly to the adult mentors and Advisory Board. As the team's lead, s/he has ultimate authority and responsibility for all aspects of the team and its members. The Lead Mentor's specific tasks include team organization, financial planning, technology mentoring, decision-making regarding issues of discipline, and overall team management.

### Mentors

The mentors of our team are dedicated adults working hard to make the season a success. They provide knowledge, experience, and insight into the design and construction of our robots. Their ultimate goal is to train members of the team to work knowledgeably on the robot or for the team and, eventually, independently of them. At all times, during build season and competitions, we respect their decisions and appreciate the judgment and experience they provide.

On trips, mentors' logistical requests and decisions are respected. Disrespect results in serious consequences necessary to maintain the unity and order of the team.

All adult mentors have completed the background check required by *FIRST*.

### Youth Mentors

Former team members who have graduated within the past few years sometimes return as youth mentors. They are a vital part of training and advising team members. Youth Mentors do not qualify to have the chaperone responsibilities of Adult Mentors until they reach the age of 21.

## 5.4 Parents

Parents are an integral part of our team and are very important to our continued success. As parent volunteers are key to all areas of FIRST, all parents can find a role in promoting the goals of the team, from designing the robot to feeding the team during the season. Parents' support in all aspects of team involvement is a key factor in the motivation, dedication, and success of their student.

Parents have several opportunities for participation, which include:

- To provide timely transportation for the student.
- To participate in a variety of ways from time to time during the year, including:
  - Providing baked goods or meals during the build season.
  - Driving students to fundraising locations and competitions.
  - Helping out at outreach programs.
- To provide accurate medical information to the lead mentor, and to keep mentors informed of all changes.
- To provide contact information, such as name, home phone, cell phone, mailing and eMail addresses, to be used for general and emergency communication.
- To provide moderate financing of their son or daughter's expenses, such as team t-shirts and meal expenses.
- *Parents are encouraged to consider becoming a mentor in one of the many areas that require leadership on the team.*

## **6.0 Funding the Team**

Team members take an active role in funding the team. Tools, equipment, events, and travel are central elements of participation, for which BOW Community Robotics provides a small percentage of funding, as well as an excellent shop from which to operate. While the Business Sub-team organizes events, all members participate in obtaining financial support for our goals. Students and parents work within the community to develop team sponsorships and grants for each season. A "Business Binder" provides direction, schedules, and prototypes of documents for our regular fundraising and outreach events. The operating budget for an FRC team ranges from \$30,000 to \$45,000 yearly.

## **7.0 Opportunities of the Build and Non-Build Seasons**

Team 4290 operates throughout the year. Students determine their level of involvement as they participate in the various opportunities provided by a FIRST team.

### **Build Season**

During the intense competition season in January and February, a demanding schedule of six days a week can be typical. Times are determined by the availability of mentors and students. Team members prepare for this time commitment by using time wisely, focusing on their grades as well as team goals, exercising choices for good health, and planning ahead. Parents share in the commitment by providing meals, driving, and mentoring in the many areas of the competition. The intensity of the demands is reflected in the intensity of the enjoyment of the competitions that begin at the end of February and can continue into April.

### **Non-Build Season**

Outside of January and February, students work on many aspects of preparation and skill- building. This is the time that each team member's focus of interest develops so that he/she can determine which sub-teams to commit to. Strong summer and fall preparation makes for less stress during the competition.

There are some specific tool skills that all students should learn during this time. These include competently using the tools present in the workshop as well as gaining experience on robots of previous years.

Students will learn about the process to design a robot. Mentors present lessons on the use of motors, the control system computer interface and programming language, or other aspects of robot construction. Presentations will also include the process of designing a robot for the FIRST competition that will occur during the build season.

Some of the Non-build Season activities include:

- a fall training phase that operates from September to mid-December;
- the ELO (Extended Learning Opportunity) program, which offers school credit to students who invest at least three hours each week in the robotics program (under development);
- outreach projects, summer workshops, fundraisers;
- training and support of local FRC teams;
- "FIRST Zone workshops" which includes times during the summer when a mentor uses an older robot to train younger members in mechanical engineering skills;
- and competitions where many team members can add experience.

### **Other Recommendations**

Team members are often very busy in many school activities. A busy schedule is encouraged and supported for the breadth of experience and demanding organizational skills it develops. **It is the responsibility of the student to manage and balance all of his/her activities, informing the mentors of any conflicting commitments.**

Sports teams provide different challenges and different stress upon a student's time. It is important to communicate with coaches ahead of time, even before the sport season begins, to work out the timing of conflicting activities. Often these conflicts can be accommodated to the satisfaction of both activities.

There are some instances, however, where the timing cannot be resolved. In this case team members will have to choose which activity is the priority. Please discuss any problems with a FIRST mentor while making challenging decisions.

## **8.0 Communication**

Communication, both reading and responding, is vital for team coordination. All students are expected to have an active Email address and to check for team communication on a regular basis. Members monitor Email at least once a day, and twice a day during build season. Responding to messages and communicating plans and ideas is not only productive but respectful.

Discord is the application that our team will be using for communication. All students and parents are invited to join our team's discord server.

## **9.0 Behavior**

In that Gracious Professionalism as defined by FIRST is central to participation in FIRST, a team member's behavior is under scrutiny at all times. Members represent BOW Community Robotics, our corporate sponsors, and FIRST. At events, school, or within the community good character described by FIRST's Gracious Professionalism should be inherent in our thinking and in our actions.

### **9.1 Visible Character**

At events, team members' behavior is a direct reflection on the character of our team. A judge or member of another team may overhear comments and criticisms. The team standard for discussion is high: respecting each other and competitors is essential at all times.

Within the team conflicts may arise as a result of the close nature of team projects and travel. All team participants should stay positive and constructive, refraining from rumors and negative comments about one another. If a problem arises, a student should speak to a mentor immediately. Physical conflict is not allowed. If a physical confrontation arises, both students may be disciplined to include termination of membership.

### **9.2 Cooperation**

Students need to be cooperative at all times, including cooperating with requests of mentors and parent leaders. Ignoring the directions or request of a mentor is not in the team's best interest. If a team member feels that a request is out of order, he/she is encouraged to complete the task and then speak to the mentoring staff at a later, more appropriate time.

"Coopertition," coined from an earlier FIRST competition, is the friendly but competitive guideline for cooperating with other teams. This term demands a healthy balance of helping whenever possible while competing to the best of our ability.

### **9.3 Inappropriate Behaviors**

These behaviors include but are not limited to: running, pushing and shoving, (negative) name calling, leaving a disorderly workspace, fighting, swearing, stealing, and all other activities that reflect negatively on the team. Conversations that undermine team unity and respect for leaders are not only counterproductive but destructive; words either build or tear down—if it is not constructive, it is inappropriate.

### **9.4 Public Displays of Affection (PDA)**

In order to reflect a professional demeanor, hand holding, hugging, kissing and other expressions of affection are prohibited during team meetings, build sessions, competitions and trips. The couple must also travel in a group at all times. Couples may not wander off or sit alone. In other words, they should not appear as a couple but as part of the team. Common sense should prevail at all times.

If a student's behavior is found to be unsafe or otherwise inappropriate, the student may be disciplined as necessary by a mentor for the overall good of the team. The lead mentor will be apprised of the situation, so that policies can be enforced. The student's parents will be informed of any disciplinary actions as soon as possible.

## **10.0 Health**

BOW Community Robotics rules require that each team member have a complete medical form on record. Students may turn in one medical form at the beginning of the season, but permission forms are still required for each event. All FIRST regulations and forms, including medical forms, should be completed

and adhered to for all robotics team activities.

In the event a team member becomes ill on a trip, transportation home will be at the parents' expense using first available transportation.

## **11.0 Competitions**

Our team competes in two two-day district competitions between the end of February and the beginning of April. Top teams from these events continue on to the state championship, where the best North Carolina teams compete. **The top teams from the North Carolina State Championship go on to the FIRST World Championship held the second or third week of April in Houston Texas.**

### **11.1 Competition Protocol**

There are certain practices that lead to success, setting the team up to earn awards and the respect of the FIRST community.

**Cheering: *Cheering is more than just yelling at the top of your lungs.*** True cheering is enjoying the event and celebrating the excitement of the moment. While cheering 100% of the time would be exhausting, participation in this experience is not only fun but valuable. Sitting in the stands looking bored or carrying on personal conversations while others are cheering does not encourage team spirit.

**Supporting our Competitors:** During the **award ceremony**, standing applause is the respectful response when other teams are recognized for their accomplishments. Disrespect in any form (booing, jeering) is highly inappropriate and not tolerated.

**Greetings:** Many mentors and judges return year after year to competitions. Making an effort to show your recognition and appreciation is good sportsmanship and makes FIRST more than just a competition.

**Litter:** Keeping both the pit and seating area tidy is safe, respectful, and pleasant for all.

#### **Things We Do Not Do At an Event:**

- Wear or use personal music devices during times when full attention is needed.
- Play cards or any other games (including but not limited to GameBoy, PSP, etc.) at an event.
- Bring or play any form of game console (e.g., XBox, PS3, etc.) to a travel location.
- Engage in negative behavior toward another team or team member.
- Display unsportsmanlike behavior over any decision by a referee or judge.
- Exchange negative remarks to each other, no matter what the situation.

### **11.2 Competition Season**

Team 4290 attends a variety of events year-round spanning from February through November. These competitions can range from one to four-day events depending on the nature of the event. No matter the length of the event, each event consists of: travel/setup, qualification matches, alliance selections, elimination matches, award ceremony, and packing up/travel back. The Team Leader for each event will provide team members and parents with the proper information. Events can range from local events within commuting distance of the school/facility to cross country trips. Travel for overnight trips are arranged by the team. See Travel section for more details.

### **11.3 Competition Roles**

Competitions are important to the team for the goals they present. Each member is assigned to fulfill a role that is vital to our success both on and off the field. Competition roles may carry over from the build season, but students are assigned jobs specific to each event. Team members carry out their roles to the best of their ability. No one job is more important than the other.

Scouting The Scouting Team includes members with a wide range of skills and knowledge, as scouting involves evaluating the capabilities of the competing robots and recording scores and consistency of performance. Scouting encompasses data entry and analysis of competing robots. The goal is to provide information for “alliance selections,” the process by which teams are formed for the finals of the competition. The importance of this information cannot be overemphasized, as winning combinations are teams that rely on each other for success.

Pit Crew The pit crew is responsible for setup and teardown of the team’s pit area, robot inspection, and the maintenance of physical subsystems during the event. Pit crew members must be knowledgeable of the robot subsystems, efficient, cooperative and professional workers under pressure, and able to work effectively as a member of the team.

Judging Representatives During the course of each competition, we have the potential to win awards in many areas, from those encompassing the robot’s abilities to those that measure our outreach and team structure. Judging representatives are responsible for preparing judging materials such as handouts, binders, technical documentation, videos, as well as any other required resources. Members represent the team to judges in various interviews, the standards we set in our pit, and even how we act as ambassadors of our team to the public. Judging Representatives must be knowledgeable and effective communicators of all aspects of the team as well as good representatives of the team in general.

Drive Team (4 members) The drive team is responsible for the on-field operation of the robot during the course of the competition. Being a member of the drive team is no small task. Members must have concrete knowledge of all game rules, be able to perform in high pressure, timed situations, possess clear, focused communication skills, work well as a team, and operate our robot to its full potential in a safe manner. Members will be required to attend multiple training sessions each week to prepare for competition events.

Media Team The media team encompasses all activities related to recording, storing, and sharing media files collected in competitions. Members are responsible for capturing both the team presence and on-field performance. On-field performance should be recorded from multiple angles to provide immediate feedback for the drive team.

Outreach Team Outreach, including cheering, assisting other teams, networking, and making the Team 4290 – Bots on Wheels well known, are also roles that are vital to success and expand relationships with other teams.

All Team Members (with the exception of “Drive Team”) are expected to volunteer as an ambassador for a minimum of 1 hour during competition weekend.

## **11.4 District and State Events**

Our team competes with teams from around North Carolina under the District Model. Our team will compete at two of the four District events during the month of March that consist of an evening of setup and inspection, followed by two days of competition. Teams collect points from their two events with the top 32 teams attending the North Carolina State Championship competition held in early April. After an evening of setup and inspections, the NC State Championship consists of two days of competition, ending in on-field finals and other awards that send the top teams to the highest level of FIRST competition. At the FIRST World Championship in Houston, Texas teams compete with other teams from around the world.

If they wish, teams may compete at Regional events held across the country. A regional event is much like a District event except with an additional day of competition and more competitors. Winners of a Regional Competition and specified awards will qualify directly for the World Championship.

## **11.5 The First World Championship Event**

The Championship Competition is very similar to the state championship in many ways but on a much larger scale. Whereas the state championship might have 32 to 40 teams, the FIRST World Championship has around 400 teams from all across the country and around the world. (The 400 teams are divided into 4 to 8 divisions: Archimedes, Carson, Carver, Curie, Galileo, Hopper, Newton, and Tesla, each with about 75 teams.) In addition to FIRST Robotics competitions, there are competitions of FIRST LEGO League and FIRST Tech Challenge as well.

Team 4290 has attended the Championship Events in St. Louis and Houston where each has been an exciting opportunity to travel, meet new friends, and show the world what we can do. They have also been an outstanding educational experience, where we have learned volumes, not only about how to build a better robot, but also about how to build a better team.

The set-up of the Championship Events varies each year. Generally, there is a large stage where there is seating for tens of thousands of people. This main stage will host the opening ceremonies, some matches and the finals which are played on a field named Einstein. Surrounding the main stage are the division playing fields to hold the seeding events. The division for each team can vary from year to year.

In addition, there is a main pit area. Each team has a pit space that is arranged numerically within divisions. Depending on the location of the championship event, the pit area can be near the stage area or, more commonly, a distance away.

## 11.6 Travel Guidelines

There are several team policies regarding travel that facilitate a fun and successful trip.

- Team rules apply at home and when traveling.
- Be respectful of teammates, other teams, and all hotel, travel and event staff.
- Do not leave an event without permission of the Lead Mentor.
- The team lodges and travels together unless specific permission is obtained from the Lead Mentor.
- Students must respectfully refrain from romantic exhibitions and private excursions during events, especially while traveling with the team. See guidelines on PDA under "Behavior."

## 11.7 Other Competitions

Our team may participate in pre- and postseason competitions (between May and November). Our involvement in these activities will depend upon financing, timing and the availability of our team members. Most of these competitions are local and will not involve organized travel. Participation in these events is encouraged, as they provide a fun and low-stress chance to let new members experience driving, robot maintenance and repair, and the camaraderie of the rest of the season.

## 12.0 College and Career Opportunities

The FIRST Robotics program is an excellent way to explore the career of engineering. During this program students are exposed to many principles of engineering and the mentoring skills of the engineers. While not all students will go into the field of engineering, team members benefit from discovering the many careers in and associated with engineering. For this purpose, the connection between mentors and team members is invaluable.

**There are many scholarship opportunities associated with the FIRST program. The mentors will be providing information regarding these as soon as they are made available. There is also information listed on the FIRST web site at [www.firstinspires.org](http://www.firstinspires.org).**

Over 430 companies, organizations and schools offer over 8 million dollars in scholarship opportunities to FIRST team members annually. The schools involved can be found at the FIRST web site. Scholarship opportunities for the new FIRST Robotics Competition season are typically finalized by September 30 of the previous year, and are posted on the FIRST web site. Deadline for scholarship application submissions is



typically early to mid-March. Scholarship contributors select recipients by early April, and notify FIRST of the recipients' name and team number. Scholarship recipients will be recognized at the Championship event in mid-April.

## **13.0 Team Norms**

- Attend nearly all meetings and work sessions and keep a time log
- During the build season, put the team above all other activities except school
- Determine Leadership Positions
- Required Forms (All Forms are found on our website)
- Participate in at least one of the sub-groups, completing assigned tasks, and assisting other groups when requested
- Contribute to the team
- Work positively and supportively
- Respect the team hierarchy
- Respect the adults who are putting their time into our team
- Respect judges, spectators, and members of the other teams at competition
- Don't argue with coaches, referees, or judges – respect their decisions!
- Behave in a way that represents our team
- Wear the team shirt to all events / competitions
- Cheer for all teams at competition
- Contribute to everyone's safety by warning against at-risk behaviors
- Keep work areas neat and free of trash
- Always wear safety goggles and close-toed shoes when working with machinery or at competition
- Maintain an appropriate academic record (not failing classes and with a GPA above 2.5)

## **14.0 Student Forms**

These are the standard forms that all students will be asked to complete and submit annually.

14.1 Student Application Forms (*required...paper application available upon request*)

### **FORMS ARE AVAILABLE ONLINE**

(Note: please complete all the forms, Student application, Student/Parent Contract, Medical, Informed Consent, and Fee Schedule. Each form should guide or navigate to the next one)

- Student Application <https://forms.gle/FFUjV79frLxaNnaT9>
- Student\_Parent Contract
- Student Medical Information
- Informed Consent and Release
- BOW Community Robotics Fee Schedule

- Register with FIRST <https://my.firstinspires.org/AccountManager/Account/Register>
- 14.2 QCRA Consent and Release and Emergency Contact Forms.  
This form is now combined with BOW Community Robotics (Electronic - see above)  
*Required each year.*
  - 14.3 FIRST North Carolina Consent and Release Form. This is an electronic form that is to be completed by the parent (if the student is under 18 years of age). Required each year
  - 14.4 *FIRST* Consent and Release Form (<https://www.firstinspires.org/>)  
This is an electronic form that is to be completed by the parent (if student is under 18 years of age) *Required each year.*
  - 14.5 Travel Forms – To be provided before trips (if applicable)

## **15.0 FRC Team 4290 Handbook**

This is a fluid document, and it is important that you fully understand the information contained herein. Therefore, participation on the team requires your signature, indicating that you understand the document and agree to comply with its contents. It is updated to include clarifications and new information as needed. As substantive changes are made to the basic document, updates will be distributed which must also be signed and returned for continued participation in the team.

## 16.0 FRC Team 4290 - FIRST / Area Structure



### **FIRST (501c3)**

INTERNATIONAL / NATIONAL

<https://www.firstinspires.org/>

First Robotics Competition (FRC) /

First Tech Challenge (FTC) / First Lego League (FLL)

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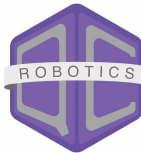
### **FIRST North Carolina Robotics (501c3)**

STATE

<http://www.firstnorthcarolina.org/>

FRC, FTC, FLL

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### **Queen City Robotics Alliance (501c3)**

CHARLOTTE REGIONAL AREA

[www.queencityrobotics.org](http://www.queencityrobotics.org)

FRC, FTC, FLL.

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### **BOW Community Robotics (501c3)**

COMMUNITY

[www.bow4290.org](http://www.bow4290.org)

FRC (First Robotics Competition)

## **17.0 FRC Team 4290 - Contact and Social Media Information**

### **LEAD MENTORS:**

Mr. Bart Carlson [bowcommunityrobotics@gmail.com](mailto:bowcommunityrobotics@gmail.com)

Mrs. Cindy Carlson [bowcommunityrobotics@gmail.com](mailto:bowcommunityrobotics@gmail.com)

### **COACH:**

Mr. Korey Gaddy [bowcommunityrobotics@gmail.com](mailto:bowcommunityrobotics@gmail.com)

### **TEAM 4290 MEETING LOCATION:**

FIRST Zone  
900 Pressley Road  
Charlotte, North Carolina 28217

**WEBSITE:** bow4290.org

### **SOCIAL MEDIA:**

Facebook: Bots on Wheels

YouTube: Bots on Wheels 4290

Instagram: @botsonwheels

Twitter: #botsonwheels

Tumblr: Bots on Wheels #4290

### **ORGANIZATIONAL RESOURCES**

FIRST Main Organization: [www.firstinspires.org/](http://www.firstinspires.org/)

NC FIRST - State Organization: [www.firstnorthcarolina.org/](http://www.firstnorthcarolina.org/)

Chief Delphi – Really great blog: [www.chiefdelphi.com](http://www.chiefdelphi.com)



## Team #4290 -Bots on Wheels 2022-2023 Student Application – Welcome

BOW Community Robotics  
FIRST Robotics Competition

Congratulations on your decision to participate in the BOW Community Robotics FIRST Robotics Team. FIRST (For Inspiration and Recognition of Science and Technology) was founded in 1992 with 28 teams and has since grown to over 3,100 teams in 40 countries. The robotics competition is an international event where high school students and professionals solve an engineering design problem in an intense and interactive learning environment. FIRST redefines winning for these students. Teams are rewarded for excellence in design, demonstrated team spirit, gracious professionalism and maturity, and ability to overcome obstacles. Scoring the most points is a secondary goal. Winning means building partnerships that last. It is not only about building the robot.

The robot is only a vehicle for a learning experience that lasts a lifetime. We are exposed to and practice the concept of “Gracious Professionalism”. A key aspect for the success of any team is teamwork. It goes beyond the group of students, because it integrates mentors from the hi-tech industries, parents, and sponsors, all working together.

**Our team is like any other competitive extracurricular activity – it requires commitment, time, and energy. Engineers from industry, businessmen, parent volunteers and community members dedicate many hours of their time to making the team a success. We expect nothing less from you.**

This is a volunteer-based program and runs after school and weekends, all year round. Each year a new competition challenge is unveiled at the beginning of January. The teams then must strategize, design, build, and program a robot to meet the challenge prior to the start of competitions. The participants learn to apply science, math, and technology to the design, construction, programming, and troubleshooting of a 120-pound robot.

### **Schedule**

**The current meeting schedule and time commitment includes the following:**

#### *During the “Pre--season” (May – December):*

Training Sessions, as required (To Be Determined) – **minimum of one day per week, one hour minimum.** There may be additional meetings on Saturdays and/or during the week for other fundraising or special event days.

#### *During the “Build--season”:*

The build season (January--February) is an intense and exciting period when all teams have been informed of the competition objectives and must complete their robot design and construction prior to their first competition. The frequency of meetings during this period will increase as needed to complete the job on time.

**A minimum time commitment of 14 hours per week, usually three (3 hour) weekdays from 6:00 pm to 9:00 pm and 9:30 am to 3:30pm on Saturday during the build season.**



Team #4290 -Bots on Wheels

## 2020-2021 Student Application – Welcome

BOW Community Robotics  
FIRST Robotics Competition

### *“Competition--season”:*

District and State competitions (Friday evening - Sunday night), are typically two to three district events in March and one – two events early April.

*FIRST* World Championship, Houston, Texas (Wednesday – Saturday), is held in April. We will compete if we qualify and have the funds.

### **Membership**

Team membership is contingent upon review by the team’s selection committee. Membership does not require a technical background. There are many departments on the team including marketing, fundraising, mechanical construction, electrical wiring, web design, safety and software development. Your interests in our departmental areas of need are a plus in the selection process (see application). Team 4290 members have decided on a maximum membership of 25 students; therefore, the selection committee will first choose individuals with interest in the needed departments.

A “Participation Fee” of \$225 (new members) or \$200 (existing members) is required and due in September of each year. (See Fee Schedule for additional details).

Each Student is required to bring in a “Team Contribution” of \$500 dollars through donations and fundraising due no later than February 1st of each year. (See Fee Schedule for additional details).

### **To be a member of the robotics team, you must commit to the following:**

- To attend every meeting (except for excused absences)
- **Abide by 14 hours minimum per week requirement (for build season)**
- To arrive on time and participate to the end of every meeting
- To willingly pursue and work diligently on your assigned task(s)
- To show respect for your mentors and teammates

Our team meets at the FIRST Zone located at 900 Pressley Road, Charlotte, NC 28217. Our team welcomes students from all area high schools, charter schools, private schools and homeschool students.

The Team Handbook is intended to provide you and your family with information about the program and your responsibilities as a team member. Please read it carefully and share the information with your parents/guardians.

We hope you will join BOW Community Robotics FRC Team #4290, for a valuable and rewarding experience.