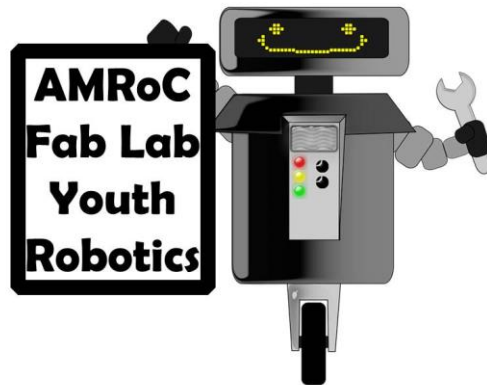




A Program of the Foundation for Community Driven Innovation – Building the Future Together

# AMRoC Fab Lab Youth Robotics Program Handbook



A program of the  
Foundation for  
Community Driven Innovation  
FFCDI.org

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# Table of Contents

<a href="#"><u>Program Objectives</u></a> _____	<b>Page 3</b>
<a href="#"><u>How it Works</u></a> _____	<b>Page 4</b>
<a href="#"><u>Team Roles &amp; Responsibilities</u></a> _____	<b>Page 5</b>
<a href="#"><u>Build Season</u></a> _____	<b>Page 7</b>
<a href="#"><u>Expectations at Meetings and Events</u></a> _____	<b>Page 7</b>
<a href="#"><u>New Member Application</u></a> _____	<b>Page 10</b>
<a href="#"><u>Code of Conduct</u></a> _____	<b>Page 13</b>
<a href="#"><u>Student/Coach/Parent-Guardian Agreement</u></a> _____	<b>Page 15</b>
<a href="#"><u>Contacts</u></a> _____	<b>Page 16</b>

## AMRoC Youth Robotics Program Objectives

The Advanced Manufacturing & Robotics Center (AMRoC) Fab Lab is a program of the non-profit Foundation for Community Driven Innovation (FCDI). One of AMRoC's signature offerings is our youth robotics programming for K-12, as well as post-high school robotics education. This handbook covers our youth programming for students in Kindergarten through high school.

### **AMRoC Robotics Program Learning Goals**

We believe high quality Science, Technology, Engineering and Math (STEM) education should be accessible to all youth, and that all youth with an interest in math, science, and technology should have an opportunity to express and explore those interests. We seek to bring K-12 project based learning through robotics as within reach as scouting, and to make it as commonplace, accessible and fun as a pick up game of basketball.

**All participants in the AMRoC Robotics Program agree to abide by our proven philosophy of “Character before Competition.”**

**Our goal is to elevate character, teamwork, and academic and intellectual achievement above all else.** We do not seek to win at all costs, but rather to give team members an enduring hands-on STEM experience that will serve them well into their futures. Putting character before competition has yielded a consistently high achieving team experiences that reliably bring home trophies year after year, and is well regarded not just statewide but nationally.

Our Youth Robotics teams agree to abide by the rules of competition set forth by FCDI in exchange for the opportunity to be involved and compete in the robotics challenges. As much as we all enjoy winning, however, our programs aren't about proving that we're better than other teams; it's about challenging ourselves to meet the highest criteria possible across a range of requirements in the course of the competition, and to create strong character driven team experiences. **The competition itself is just a vehicle to demonstrate skills mastery, and to provide a fun and engaging opportunity to exercise science, engineering, math, technical, interpersonal and professional skills gained in the course of the season. Winning is the ultimate incentive to repeat and improve learned skills, of course, but winning shouldn't be confused with succeeding.**

Our goal for youth involved in our AMRoC Robotics programs is for students is to develop exemplary professional conduct and to them teach solid design, engineering, programming, professional and technical skills in a fun, collaborative environment that hones teamwork and communications skills.

**Competitions may be won or lost for any number of reasons. But a team with character, skill and class will always be successful.**

## How It Works

AMRoC Youth Robotics effectively engages students from all backgrounds and skill levels, instilling new ideas and concepts in more experienced students, while helping to inspire, motivate, and encourage learning basic principles and skills among students with less experience. Through their robotics team involvement, students also learn about important, life-long team skills such as planning, research, collaboration, mentorship, and teamwork, and are eligible for over \$80 million in scholarships.

### **BENEFITS OF TEAM MEMBERSHIP include:**

- **SCHOLARSHIPS** – for high school aged students, over \$80 million in scholarships
- **TRAVEL** - to League competitions with the goal of making it to the Houston Championship in April, recognizing top teams worldwide.
- **EXPERIENCE** - many corporations across the nation are participating in the youth robotics program we support and want to hire students who have participated in these programs. **NEW SKILLS acquisition** and the opportunity to explore careers in business, visual arts, science or technology. AMRoC emphasizes high quality training opportunities in CAD design, programming, building and design, and public speaking.
- **TEAM BUILDING** skills that **PREPARE STUDENTS FOR LEADERSHIP ROLES.**
- **FUN experience** meeting and networking with students and experts in a variety of fields.

### **A TYPICAL SEASON**

The robotics “season” officially begins in August/September for *FIRST* LEGO League Jr., *FIRST* LEGO League and *FIRST* Tech Challenge and VEX teams. *FIRST* Robotics Competition season starts in January. Team members have 10-12 weeks to design, build and program a robot to perform that season’s challenge. Teams compete in two to three League meets or tournaments, and a League or program Championship, usually starting in November, and try to earn sufficient ranking points to earn a spot at the *Youth Robotics* State Championship, usually held in February.

Typically, AMRoC meets year round for fundraising, team building, training, and organizational activities. In the off-season, during the spring and summer, we may meet only once or twice a month, and for special team building and training programs. In-season, teams usually meet at least once a week, and meetings last 4-6 hours. Sometimes there will be take-home work to complete between meetings (i.e Engineering notebook entries, programming, team spirit projects, etc.). Meeting schedules and activity plans will be posted to our email work-list and available on our website.

### **JOINING AMRoC Youth Robotics Teams**

If we have membership openings, interested students must complete the application near the end of the handbook for consideration. Applicants under consideration will be invited to three team meetings, to determine if the student and team are a good fit for one another. As community based teams, members from public, private and homeschools are welcome to apply to be part of our team, but priority is given to University area students.

Student members must comply with attendance, behavior and grade maintenance requirements to remain part of AMRoC.

## Team Roles and Responsibilities

**TEAM ROLES and RESPONSIBILITIES** may include, but not be limited to, the following (students may be part of multiple sub-teams, as needed and able):

### **Project Lead**

The project lead coordinates overall engineering and design of the robot with communications, building and programming leads, and works in cooperation with coaches and mentors to achieve season objectives. The project lead is also responsible for organizing and scheduling team meetings, setting team priorities and keeping members focused. It's a big job, and other team members are expected to cooperate with and assist the project lead for effective team work and project success. The project lead is also responsible for related Engineering notebook entries.

### **Communications Lead**

The communications lead is responsible for ensuring effective and cooperative conduct and communications among all members, an especially important role during competitions and tournaments. Team members are expected to cooperate with the communications lead and follow communications protocol and etiquette throughout the season.

### **Building Leads and Build Team**

The lead builders make decisions about building, and work to achieve consensus among team members on the mechanical design of the robot using guidelines developed by the team. Builders make related journal entries for robot design and construction. The Build team will include someone responsible for Quality Assurance who will ensure that all wires and critical components of the robot are secured and in compliance with Challenge guideline and requirements. The Build team will also include someone responsible for hardware and tools management, to ensure that all equipment is well cared for and properly stored and inventoried.

### **Awards Team**

These members will ensure that we're working effectively towards the highest award recognition by being well informed about award requirements and encouraging and guiding team members towards top performance in all areas.

### **Chief Systems Analyst**

This person, in coordination with the coach and adult mentors, is responsible for knowing game rules, robot mission and challenges, and communicating this critical information to team members. The CSA will also verify that programming, mechanical solutions and proposed solutions are addressing needed goals.

### **Programming Leads and Programming Team**

Lead programmers ensure that programs are completed by appropriate deadlines, and are responsible for Engineering notebook entries related to programming. Programmers will ensure that programs work 90% of the time or better, and will schedule time with builders and drivers for changes and driving practice.

### **Safety Captain**

The Safety Captain, in coordination with an adult mentor, will help establish safety rules and plans to enforce them. Responsibilities include ensuring that sufficient safety glasses are available and that they are worn by adults and youth at relevant times during practices and competitions, and that clothing and behavior is appropriate with respect to safety of team members and others.

### **Team Video Manager**

The Team Video Manager is responsible for coordinating the look and over all quality of the team video, which will be viewed by judges prior to competitions for award recognition at events. This is a critical role in earning the Inspire Award, the top award given. The Team Video Manager will ensure that the team communicates clearly about their robot design in the video, and that the team presents itself well in the final product. To that end, the Team Video Manager will coordinate all aspects of filming and production.

### **Marketing and Fundraising Manager**

This team member, in coordination with adult mentors, is responsible for helping create a team business plan, coordinate fundraising efforts, assist with community outreach opportunities, and maintaining team finance records. The Marketing and Fundraising Manager will also ensure that the team “look” is effective, neat and well presented, and will also help develop and maintain sponsorship and team information packets, and will help with team blog entries.

### **Photojournalist**

This team member helps document, via video and photography, the team year, and updates the website with photos. The complete build process should be chronicled, as well as tournament activities, with photos for use in marketing and news media.

### **Team Spirit**

This member will help create team cheers, pins, banners, signs, and competition give-aways for fun and PR, and help develop the team’s identity with respect to encouraging spirited support and fun at meetings and events.

Additional roles may include:

**Robot Drive Teams** – Teleop (RC) drivers are typically those members who show an aptitude for remote control finesse, strategy and precision, but all who are interested are welcome to learn to drive and will be given opportunities to drive, or at least coach drivers, on the field during competitions.

**Public Relations** – members who speak with other teams and coordinate team specialists to help other teams, as well as create connections within the community

**Website Manager** – a member proficient with and comfortable with website maintenance and posting

## Build Season

### Team Meetings

**Build season meeting attendance is mandatory** – If a team member can't make a meeting, please advise team mates and coach as soon as possible.

Meetings and agendas, as well as all other important notices, are announced and archived at our team work site (usually Slack) to which all members will belong. Electronic communications are the preferred form of communications and *all members are expected to check their email and related digital communications platforms regularly and to actively communicate with one another and the coach about meetings.*

*Please note:* AMRoC Robotics Programs institute a “**build freeze**” one week before every competition. All major design and construction must be completed well in advance of competitions, and at the one week mark, no major structural or design changes will be made to the team robot. This is a firm rule.

### Meeting Agendas

The agenda for each meeting, with specific tasks and goals, is coordinated between the team leaders and the coach(es). 15-30 minutes will be allotted at the start of each meeting for general administrative housekeeping, working on research project (FLL & FLL Jr), with 30 minutes are allotted at the end of each meeting for clean up. Agendas will be provided to members in advance of each meeting.

## Expectations at Meetings and Events

### Expectations at Meetings

**Gracious Professionalism and Respect** are expected at all times, for each other, for adult coaches and mentors, and for anyone with whom you're working, anywhere, at any time.

***\*\*Any student who shows a pattern of conduct outside of Gracious Professionalism and respect will be dropped from our program. Any parent/guardian who shows a pattern of conduct outside that required of students, will have their child or children removed from our programs. Coaches and mentors are also expected to abide by rules of Gracious Professionalism at all times as well. \*\****

- **Be an Active Participant** – If there doesn't seem to be enough for you to do, tell us; work with other team mates; take the initiative when you see something that you can do; don't wait to be asked to help.
- **Be Informed** – All members should be thoroughly familiar with rules of the competition, team goals, arrive ready to work at meetings, and understand individual and group tasks.
- **Communicate** – Ask questions if you need help or don't understand something. Communicate clearly, often and openly with each other, your coach and mentors

- **Be Responsible** – Be conscientious about the use and maintenance of equipment, parts and tools. Put things where they belong so they can be easily located when needed. Get to meetings on time; be sure you know what your role is and carry out your responsibilities at meetings. Clean up after yourself, and help others do the same.
- **Have Fun!!** The more respectful, professional, informed, communicative and responsible you are, the more fun you'll have and the more memorable and enjoyable your experience, and that of your team mates, will be.

### Expectations at Events

***\*\*The same consequences outlined above, for youth and adults, are applicable for any violations of conduct at events, as well as at meetings.\*\****

- **Be Graciously Professional** at all times. Help your team mates and other teams as able. *No trash talking, or rudeness, ever* – of opponents, one another, students or adults.
- **Be Positive!** - Team members are expected to participate at all times in a positive and helpful manner, whatever the competition outcome or trend.
- **Show Spirit!** – Support your team by cheering and sign waving. Cheer other teams, too.
- **Look Good!** – Wear your team shirt, tan/khaki pants with a belt, and closed toed shoes. Sport a neat, clean appearance; no baggie pants, or loose items of clothing, for safety reasons as much as appearance.
- **Be Safe!** – Wear safety glasses where required; Look where you're going at all times and pay attention to what you're doing.
- **Have Fun!**

### Qualifications for Attending Competitions

- **School always comes first!** A minimum of a B (3.0 GPA) or, in the case of homeschooled students, evidence of equivalent academic commitment, is required to remain a member of AMRoC.
- **Appropriate behavior at all times**, including at school and in your community, as well as at competitions or events.
- **Attend 75% of meetings at a minimum, 90% of meetings if you head up a build team.**



- **Complete and return all paperwork in a timely manner** – Throughout the year, various forms and agreements will be required. Please be responsible about completing and returning them.
- **Meet Expectations of Behavior and Conduct** previously listed.

### **EXPECTATIONS of COACHES, MENTORS, FRIENDS & FAMILY MEMBERS**

- Adults working with youth in AMRoC may be asked for background checks.
- Adult participants are expected to adhere to the same behavioral guidelines set forth for youth, at AMRoC or at competitions or tournaments.
- **Only student team members, with support as needed from FCDI/AMRoC Fab Lab coaches and official mentors, work on robots or related build, programming and research projects.**
- Family members are highly encouraged to attend events and cheer on team members, regardless of competitive success!
- Adult mentors and coaches are learning guides, and are expected to put student design and build preferences over their own, in the service of student ownership of the team experience and maximum learning benefit.
- While short pit visits are welcome during downtimes at competitions, parents, friends and family members are asked to enjoy competitions and tournaments from the stands unless otherwise requested by coaches or mentors.
- FCDI/AMRoC Fab Lab coaches, in collaboration with student team members, have the final say in all matters pertaining to team build and competition decisions and protocols.

## AMRoC Youth Robotics New Member Application

STUDENT NAME

---

DATE\_\_\_\_\_

ADDRESS\_\_\_\_\_

PHONE #\_\_\_\_\_

E- MAIL\_\_\_\_\_

CURRENT GRADE \_\_\_\_\_

SCHOOL\_\_\_\_\_

DATE OF BIRTH\_\_\_\_\_

PARENT/GUARDIAN NAME

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PARENT/GUARDIAN OCCUPATION

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PARENT/ GUARDIAN HOME & WORK PHONE #s

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HEALTH or MEDICAL CONDITIONS of which we should be aware (*this has **nothing** to do with acceptance, but helps us keep team members safe and helps us plan activities!*)

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What aspects of the team are you interested in? Check all that apply. This does not lock you into a work area. We are just interested in learning more about you. Experience is not necessary; all students are offered guidance and training.

- Mechanical Engineering
- Electrical Engineering
- Programming
- Game Strategy
- Drafting Design
- Publicity / Marketing
- Finances
- Other? \_\_\_\_\_

Do you have any programming, building, writing or other educational, special interest or hobby experience that you feel would be helpful to the team? If so, please identify and tell us the extent of your experience. (Ex. C++, CAD design, MS Publisher, photography or photo editing, shop classes, hobby electronics, etc.)

Are you involved in other organizations, extra-curricular activities or sports? If “YES”, please list them:

Are you able to attend after school meetings? If so, starting at what time?

Are you able to attend evening meetings?

Are you able to attend Saturday meetings?

As a member of the team you are required to attend a minimum of 75% of team meetings / activities, and maintain a minimum B average (or homeschool equivalent) in your studies. Are you able to meet these requirements?

Are you able to travel to competitions?

## APPLICANT ESSAY QUESTIONS (youth 10+)

\*\*\*Completion of these questions by the student only please, is required.\*\*\*

To be considered for membership on an AMRoC youth robotics team, please answer the questions below, taking time to consider your answers carefully. There is no right or wrong answer to these questions, but through your responses, we hope to learn more about applicants and their interest to assist in future program planning. If an excess of applicants exist, the response to these essay questions may be used in a selection process.

Why do you want to join the team?

What do you expect to gain from this experience?

What qualities/experiences do you bring to the team that you feel will make you a significant contributor?

Are you involved in other organizations, extra-curricular activities or sports? If “YES”, please list them and tell us something about your involvement in them.

# AMRoC Youth Robotics Program CODE OF CONDUCT

## Gracious Professionalism and AMRoC

Your signature is required below, and indicates that you have read and agree to abide by our Code of Conduct and our statement of Gracious Professionalism, which is integral to our success as a team and as individuals.

**Gracious Professionalism (GP) is the central tenet of *FIRST* robotics and the embodiment of the AMRoC Youth Robotics Program philosophy. It is how we should strive to act, whether we are being watched or not, and in a way that would make those we admire most proud. Gracious Professionalism demands that we treat others with kindness and respect, communicate with one another clearly and honestly, and resolve conflicts and misunderstandings immediately.**

**Gracious professionalism encourages us to learn and urges us to compete with heart and spirit, but requires that we treat one another with respect and kindness in the process. Gracious professionalism is part of pursuing a meaningful life. It encourages high quality work, impeccable ethics, respect for yourself and others, and the ability to compete in a gracious manner. Gracious Professionalism represents everything the AMRoC Youth Robotics Programs stands for and, commensurately, that we trust any member of our youth robotics programs stands for, as well.**

## AMRoC Youth Robotics Code of Conduct

Team members will exemplify Gracious Professionalism by:

- Being inclusive and respectful to one another, to other teams, coaches, mentors, parents and other adults, to team property, and to our meeting places, at all times.
- Refraining from disruptive behavior that affects your own team or others.
- Being helpful to one another and others whenever the opportunity arises.
- Actively participating in meetings, competitions and events with a willing spirit of cooperation.
- Showing class and dignity whether winning or losing on the field and regardless of the overall outcome of an event.

Consequences of violating our Code of Conduct may include:

1. A written apology to all team members and to anyone else involved that acknowledges and takes responsibility for the specific misconduct and describes how such mistakes will be avoided in the future.

2. Subsequent activity with the team will be on a probationary basis for the remainder of the season or the following build season, whichever comes Youth Robotics, with the understanding that any and all future instances of misconduct will result in the offending parties involved being sent home immediately. Repeated misconduct with no evidence of attempts to learn from previous mistakes will result in removal from the team.

**I have read the above statement and will abide by Gracious Professionalism and the AMRoC Code of Conduct:**

Signed: \_\_\_\_\_ Date: \_\_\_\_\_  
(student)

Signed: \_\_\_\_\_ Date: \_\_\_\_\_  
(parent)

I, hereby verify that the information and statements on this application are true, to the best of my understanding. I also pledge, if chosen as a AMRoC team member, to meet all requirements of scholastic standing, fundraising, attendance and participation in order to remain a member in good standing.

\_\_\_\_\_  
Student Signature date

I, as parent or legal guardian verify that I have read and understood all of the information contained in this information package.

\_\_\_\_\_  
Parent Signature date

*Please email a scanned copy of this agreement with your signature to us at [Terri@FFCDI.org](mailto:Terri@FFCDI.org)*

You will be notified of consideration within two weeks. Student and parent or legal guardian must attend your Youth Robotics meeting together. Accepted students must complete the Coach/Student/Parent Agreement which follows.

# COACH/STUDENT/PARENT/GUARDIAN AGREEMENT

## COACH AGREEMENT

- I will abide by the same core values\* that I expect of you as team members.
- I will ensure that all students have opportunities to participate in as many aspects of the team experience as they are interested in.
- I will start and end meetings on time.
- I will have specific recommended goals, determined in coordination with team members, to achieve at each meeting.
- I will communicate regularly and keep you apprised of important deadlines and opportunities.
- I will always listen to you.
- I will facilitate team meetings and help guide your discovery, but final engineering decisions, made within the guidelines set forth in this handbook, rest with team members.

Signature of coach \_\_\_\_\_ Date \_\_\_\_\_

## STUDENT AGREEMENT

Please check each item you can honestly agree to

- I realize that no problem has only one solution, and that a successful team is one which cooperates by considering everyone's solutions and ideas. I will not denigrate anyone's ideas or thoughts and will listen to other team members and support and encourage them.
- I agree that my behavior at meetings and tournaments will be constructive and above reproach, and I will abide by AMROC Youth Robotics Program Core Values\* at all times, especially "Gracious Professionalism".
- I agree that each team meeting is valuable and I will attend each meeting as best as I can. If a conflict arises, I will notify my coach in advance.
- I will be responsible for my own communications with the coach(es), and responsive, responsible and inclusive in communications with other team members, as well.
- I agree to cooperate on whatever solution the team chooses, even if it is not my Youth Robotics choice.
- I understand that my position on the team is a privilege and that if I am disruptive or disrespectful to others at meetings or tournaments, or violate the terms of this agreement, I may be asked to leave.

Signature of team member \_\_\_\_\_ Date \_\_\_\_\_

## PARENT-GUARDIAN AGREEMENT

- I agree, in the spirit of the AMROC Youth Robotics program goals that, regardless of how qualified I may feel to intercede, I will not interfere with the coaches' coaching, the team's solutions or do my child's work or communications for him or her. All engineering creations, inventions, ideas, and communications (unless otherwise requested) ***must come from student team members under the guidance of program coaches and mentors***
- I agree to make every effort to have my child attend every team meeting. If there is a schedule conflict, either my child or I will notify the coach as soon as possible.
- I understand that my child has a commitment to his/her team and that it is my child's responsibility, not mine, to meet that commitment.
- I realize that my child's coach is contributing a significant amount of time and effort to provide a rewarding educational experience for the team. I will try to be cooperative, helpful and patient as possible.
- I understand that if there are any problems with my child at meetings or at tournaments, my child may be dismissed from the team but that I will be notified of problems as they arise.
- I have discussed all items listed above with my child

Signature of parent/guardian \_\_\_\_\_ Date \_\_\_\_\_

### ***\*AMROC Youth Robotics Program Core Values***

- **Discovery:** We explore new skills and ideas.
- **Innovation:** We use creativity and persistence to solve problems.
- **Impact:** We apply what we learn to improve our world.
- **Inclusion:** We respect each other and embrace our differences.
- **Teamwork:** We are stronger when we work together.
- **Fun:** We enjoy and celebrate what we do!

\*\*Gracious Professionalism is a way of doing things that encourages high-quality work, emphasizes the value of others and respects individuals and the community. According to Dr. Woody Flowers, who coined the term, "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."

## **AMRoC Youth Robotics Contacts**

Program organizers & coaches:

- Terri Willingham: [Terri@ffcdi.org](mailto:Terri@ffcdi.org)
- Steve Willingham: [Steve@ffcdi.org](mailto:Steve@ffcdi.org)
- Chris Willingham: [CLWillingham@gmail.com](mailto:CLWillingham@gmail.com)