



FIRST[®]
ROBOTICS



THE DESPERATE PENGUINS

TEAM HANDBOOK

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Mission Statement

The mission of FIRST Robotics Team 1504, "The Desperate Penguins" is to allow students and mentors to share and apply knowledge of engineering, business, and leadership skills through a fun, hands-on experience. As a team, members work toward a common goal of designing, building, marketing, and operating a competitive robot in a business-like environment exemplifying gracious professionalism, while supporting the ideals of FIRST. We operate all aspects of our team using the 5P's (Prior Planning Prevents Poor Performance)

Team Units

The Desperate Penguins Robotics Team is made of four major units to enable the team to complete the FIRST project efficiently. By dividing into specialized units, students are able to focus on specific aspects of the project. Students will volunteer and/or be assigned by the faculty advisor(s) to these units in the fall, well ahead of the beginning of the build season. Each unit is further organized into sub groups. There are many groups for which members can specialize. Students will be placed into a group based upon their interest whenever possible. A student may participate in multiple groups during the season.

Mechanical Unit:

Chassis Group:

The chassis group is responsible for designing the robot chassis, as well as coordinating the location of the various components to be mounted on the chassis.

These include the following:

- 🔧 Drive train, including drive motors, gears and wheels.
- 🔧 Electrical components
- 🔧 Pneumatics including compressor and cylinders.
- 🔧 Any special devices unique to the game, such as ball gathering or stacking equipment.
- 🔧 Monitor the weight and center of gravity of the robot, paying attention to the weight of all materials used by each group.
- 🔧 Compile CAD drawing for completed robot

This group is responsible for meeting the specifications and functions defined by the strategy/design committee.

Drivetrain Group:

The drive train group is responsible for designing and building the drive train, including selecting the motors, gearbox/shafts/chains and wheels. This group is responsible for meeting the specifications and functions defined by the strategy/design committee.

Game Specific Group(s):

The game specific group(s) is/are responsible for working on the devices that are unique to the current year's game. This includes a scale model mock up of any playfield device that will help the entire robot practice for the competition. This group will have instrumental focus on the game strategy throughout the robot competition lifecycle. This will include factors to game success discussed by strategy design group and focus on scouting forms and data collection during competitions. This group is responsible for meeting the specifications and functions defined by the strategy/design committee. In the past, this has included devices to stack boxes, gather balls or knock down boxes.

Robot Controls Unit:

Wiring Group:

The wiring group is responsible for wiring all motors, compressor, victors, relays, solenoids etc. Furthermore, the wires shall be labeled and neatly arranged and for ease of maintenance. This group is responsible for meeting the specifications and functions defined by the strategy/design committee.

Pneumatics Group:

The pneumatics group is responsible for pneumatic equipment, including storage tanks, valves, and tubing. This group is responsible for meeting the specifications and functions defined by the strategy/design committee.

Controls Group:

The controls group builds the joysticks and/or the equivalent remote control module, and wires them to the operator interface. This group is responsible for meeting the specifications and functions defined by the strategy/design committee.

Programming Group:

The programming group uses software provided by FIRST to create a program that allows the robot to perform various tasks and functions either autonomously or by human control. This group is responsible for meeting the specifications and functions defined by the strategy/design committee.

Business Unit:

Chairman's Award Group:

The Chairman's Award is the greatest honor in the FIRST competition. The award is given to the team that best exemplifies the ideals of FIRST. To exemplify FIRST, a team must show community involvement, demonstrate their partnership, inspire other teams, be a role model and be of service to the community of FIRST.

To earn this award the team must demonstrate all aspects of their team by the creation of a Chairman's award submission. There are very specific criteria for this submission as well as a specific due date.

This group is made up of students that are interested in documenting our team's efforts in the form of a submission. Coordination with other groups is essential for the success of the project. The resulting document is a chronicle of our team's efforts.

Woodie Flowers Award Group:

The Woodie Flowers Award is the greatest honor given to an adult mentor in FIRST Robotics. The award is given to the teacher or engineer that best exemplifies the ideals of FIRST. The mentor teaches or shares his or her experiences with those that he or she works with. To earn this award the team must demonstrate why their mentor deserves this award by the creation of a written submission. There are very specific criteria for this submission as well as a specific due date.

This group is made up of students that are interested in documenting the teacher

or engineer's efforts in the form of the aforementioned submission. Coordination with other groups is essential for the success of the project. The resulting document is a chronicle of the mentor's efforts.

Animation Group:

The animation group uses a software program provided by FIRST to create an animation based on the FIRST animation rules. The group leader must report on the progress to the remainder of the team at the weekly coordination meeting.

Communications Group

The communications group is responsible for all forms of team communication. This includes the website, newsletter, Gmail Group, and school announcements. All forms of communication must represent Team 1504 in a professional manner and must include visual representations of its main sponsors.

The team website is <http://www.team1504.com>. Students must know/learn basic website codes (HTML, XHTML, etc...) to design, maintain, and update the website. They must also monitor and respond to the questions regarding the "forums" and other team issues.

The newsletter, named The Penguin Post, must be published monthly during preseason and postseason, but bimonthly during build season. It should contain information strictly on Team 1504, FIRST, or other related matters of interest. All team members are required to join the Gmail Group, which is the most efficient way to communicate throughout Team 1504. Postings must remain professional and may contain information strictly on Team 1504, FIRST, or other related matters of interest.

School announcements must follow the school's guidelines (which can be found in the administrative office). They must be announced at least one full week prior to the announced deadline, event or meeting.

Media Group

The media group is in charge of team photos and videos, as well as team media opportunities. Media opportunities include, but are not limited to, the following: newspaper and magazine articles, TV and radio broadcasts, and Okemos publications (ex: yearbooks). This group will be working closely with the Chairman's Group.

Team photos should be consistent in size and resolution to avoid future problems. They must be professional and represent the team as whole. Photos should be taken year-round, at all team activities and also at team meetings, since they are the best way to preserve Team 1504's accomplishments and memories. These photos may also be used in award submissions and sent to contacts for media opportunities.

Videos must also be professional and represent the team as a whole. Two types of videos can be taken to capture the team, or to capture the competitions. The video capturing the team should be taken during all team activities and also at team meetings. This video will serve as a moving document to preserve the team. The

video capturing the competitions will be used to analyze other teams at the competition.

Students in the media group will be responsible for contacting media personnel to cover Team 1504. This will involve calling media personnel, arranging dates to meet, setting-up interviews, preparing interviewees, and assisting the media personnel throughout their visits. Students may also be asked to provide photos for the media personnel. This group will be directly responsible for a yearly DVD that can be use the next year for promotion of the team.

Promotions Group

The promotions group is responsible for the team's visual appearance. Members will work on promotional gimmicks, such as pens and buttons, and team uniforms. The Pit is a major task for this group and involves the decoration and business organization of the Pit to attract more people to come see Team 1504. The final Pit design will be a collaborative effort between the promotions group & the Pit Crew. This group will also be in charge of preparing a theme and executing it throughout the team.

Rules Group:

This group will study the robotics game rules and ensure that they are followed during the build and competition seasons. Their first order of business each year is to meet to review ALL rules documentation as soon as they are available. They will document rules concerns and bring them to the strategy meetings and discuss these issues as points of communication to keep strategy sessions on track with the rules. They are responsible for communicating with the mechanical, electrical and control groups to make sure that from the initial design, no illegal materials or methods are used.

This group will be in charge of the scouting of other teams at the competitions. They will prepare scouting reports for each team to be used for the devising of strategies for each match. They will also prepare a ranked list of competitors for the purpose of choosing alliance partners at the competitions. They may recruit students and mentors from other groups to assist in this responsibility. This group will work closely with the Game specific group at the beginning of the year.

Pit Crew:

The Pit Crew has several functions depending on what stage of the competition we are in. In the fall they are responsible for maintaining last years robot and tools. The pit crew may come from any of the mechanical or electrical groups after the build season.

Made up of:

- 2 Mentors
- 2 Group Members

Build Pit Crew:

1. Keep track of all robot components and organize the kit of parts.
2. Inventory all tools and make pit usable during build season
3. Continuous inventory of tools and clean up of pit during build season
4. Distribute parts from past years to mechanical groups to separate usable parts for present and future years
5. Pit crew group members must make sure all tools are put away at the end of each build day
6. Pit crew members must police pit area and shop area where groups are working to make sure their work area is cleaned before they leave each build day.
7. Pit crew members will be instrumental in the safe use, maintenance, and storing of the tools.
8. Pit crew members and mentors are responsible for loading and unloading of team trailer
9. Pit crew mentors and team members are responsible for maintenance and upgrades to the robot cart

Competition Pit Crew:

1. Pit mentor will pick 2 team members to arrive early at competition to uncrate the robot, bring in pit roll cart, and start to set up the pit
2. Pit mentor and team members are responsible for loading and unloading of team trailer
3. Pit mentor with team members will set up pit in orderly phases One pit crewmember will be the tool and *Safety captain*. Important in this role is the timely return of tools to the pit box. This may mean during competitions manning the toolbox to issue tools to and from the toolbox. This person will maintain a clean and organize tool crib and pit box.
4. During competitions the Safety captain will be responsible for safety glasses inventory daily. They will insure that all duties performed in the pit area follow all First safety guidelines.
5. One pit crewmember will be solely responsible for battery power. Charging , issuing and making sure all batteries are competition ready.

Team 1504 Student Code of Conduct

Students must be able to function in a positive environment in order to be productive. The Team 1504 Student Code of Conduct is the means of ensuring this positive atmosphere. Students are expected to know and abide by the Code. In order to create the business environment students will be accountable for all of their actions and in the case of repeated infractions of the Code that student will meet with the team leader and be reminded of their responsibilities to the team. Their responsibilities are listed below.

1. Student members are expected to attend all meetings and be on time or follow the procedure of excusing an absence.
2. Student members must remain on task at all times.
3. Student members must act in a gracious and professional manner.
4. Student members must treat all Mentors and Faculty Advisors with respect.
5. Student members should show dedication to FIRST and Team 1504 by participating in expected team events.
6. Student members **MUST** follow all of Okemos High School's safety rules.
7. Student members must follow Okemos High School Code of Conduct.
8. Student members are expected to treat all other team members with respect
9. Student members will show respect for Okemos High school's and Team 1504's property and reputation.
10. Student members must check their email at least once a day, and respond to all requested actions by the deadline provided.
11. Student members must wear team uniform at set team events.
12. Student members are expected to maintain good study habits and grades during the season.

Safety

In order to run any successful business or team, a high level of safety must be observed, practiced, and maintained. The following rules are designed to ensure the safety of students, faculty advisors, and mentors.

1. Safety glasses must be worn at all times in the shop.
2. All students and mentors are required to provide their own pair of safety glasses, or they will not be allowed in the shop area.
3. The only power tool that students may use are the ones they have passed a safety test for. Students must pass a safety test with an 80% or higher.
4. Students are allowed to take the safety quizzes as many times as they want until they pass. Students will also have to demonstrate safe use of the power tool before they may use it on their own. Only qualified students may use power tools.
5. Horseplay will not be allowed or tolerated at any time.

Attendance

Attendance will be taken throughout the build season and at team events. This section will discuss how attendance will be taken and how to excuse an absence. Team members must realize that good attendance is essential to making the team successful. Attendance will also be a factor in determining which students make the travel team.

Build Season

1. Attendance will be taken through use of a sign-in sheet, which will be located at the front door of the build site.
2. During the build season attendance will be taken at every meeting.
3. The Secretary will transfer the data from the sign in sheets into a master-log on a weekly basis.

Pre/Post build

1. Before and after the build, attendance will be taken with a sign-in sheet.
2. Students will sign in before the meeting or events starts.
3. The Secretary will then check off everyone who was present in the masterlog.

Competitions

1. For competitions attendance will be taken twice in a role call fashion.
2. Role call will be taken upon departure from the high school and upon leaving the competition.
3. If a student leaves early they must inform the Faculty Advisor(s) [in writing](#) and have a Parent/Guardian present.
4. Additional role calls may be taken for travel events.

Absences

1. In the case of an absence the student is responsible for excusing him/herself.
2. Absences may be excused in two ways. The first way is for a parent to call the Faculty Advisor and excuse the absence or for the student to write a note explaining the absence and deliver that to the Faculty Advisor.
3. Absences must be excused prior to 24 hours before the event.

Fund Raising Activities

All student members of Team 1504 are required to participate in our team fund raising and community service activities. These activities will occur during the off season (not during the six week build season) Students that do not participate in these activities will be excluded from participation in the build season or competitions. The fund raising and community involvement projects will be determined by the team fund raising coordinator.

Faculty Advisor(s)

The robotics team is recognized by Okemos High School and the Okemos Public School District as an academic club and is considered one of the extra-curricular offerings available to students who attend Okmeos High School. All academic clubs at Okmeos High school must have a faculty advisor or advisors that sponsor the activity. One of the underlying principles of the club process





at Okemos High school is to assist in the development of leadership skills in the students who choose to participate. Therefore, the students share in the responsibilities of conducting all club operations and activities. The faculty advisor(s) are merely involved to the extent of serving in an advisory capacity as well as help to facilitate club operations and activities. More specifically, the responsibilities of the faculty advisor(s) are:

1. Assume responsibility for the safety and welfare of the participants in the team.
2. Serve as a liaison and contact person between the team and high school administration.
3. Assume full responsibility for the handling of any funds as necessary and work with the Finance Committee- for Finance in overseeing the expenditure of funds as appropriate to facilitate team functions.
4. Serve in a supervisory capacity and coordinate the supervision of team members while team members are meeting on and off school property, as well as attending competitions.
5. Oversee and arrange for travel and hotel accommodations when necessary.
6. Serve as the liaison between the team and the FIRST organization and see that communications received by FIRST are disseminated to the appropriate team members or mentors.
7. Serve as the liaison between representatives from sponsors and the Okemos Public School District.
8. Organize, coordinate and facilitate the recognition of team members and sponsors/mentors at the year end banquet.
9. Work with the Assistant Superintendent for Finance to facilitate the recognition of sponsors before the Okemos Board of Education.
10. Work closely with the team in the development of team activities and functions as well as the various committees and work groups.
11. Develop and maintain a working list of team participants, mentors and parents including telephone numbers and email addresses where applicable.
12. Oversee all team operations and functions.
13. Responsible for appointment of mentors to specific groups and all committees.
14. Responsible for Project Manager and Group Leader appointment and dismissal, when necessary.
15. All advisors must maintain full communications between other advisors on any issues or decisions to be made.

Committees

Several standing committees need to be in place for the smooth operation of the robotics team. The committees listed and described below require dedicated students and mentors. Other ad-hoc committees may be formed as necessary.

- 1. Steering Committee** – This committee is comprised of two to three mentors, the Faculty Advisor(s), and student leaders. Their goals are as follows:

-  Make recommendations for possible bylaws changes.
-  Create a schedule of activities and goals to achieve for the fall season.
-  Assist the chief engineer in creating a detailed schedule for the build season.
-  Host a “pros and cons” annual meeting and make recommendations to

improve team organization to improve success.

- 2. Travel Committee** – This is a small committee comprised of mentors and the Faculty Advisor(s). This committee will decide who will attend out of town robotics competitions, as well as make decisions and arrangements for travel. They will be responsible for preparing trip proposals and permission slips to submit to HS administration.
- 3. Food Committee** – this very important committee is typically comprised of a few parents who coordinate the food arrangements. (Note: all parents are expected to provide food for at least one meeting during the six-week build season.
- 4. Strategy/Design Committee** – This committee is comprised of mechanical, robot control, rules group leaders, the project manager, and the chief engineer, and a group of two to five mentors appointed by the faculty advisor(s).

This committee is responsible for developing a game playing strategy and a list of functional specifications for the robot as quickly as possible. They will assign functions to the mechanical and electrical/control groups. They will communicate the strategy and specifications to the rest of the team. The group leaders will then meet with their groups to develop robot subsystems and electrical/control requirements to achieve their assigned functions.

They will then meet to present their subsystems to the committee and develop an initial design for the robot. At this time, they will assign mass and power to the groups and will create an initial drawing of the robot. They will meet at least weekly to report progress to the committee. At these meetings, engineering, manufacturing, and other resources will be prioritized and may be reassigned for the timely completion of the robot.

- 5. Finance Committee** – This committee is comprised of Mentors and the Faculty Advisor(s). Their role is to set the annual budget and approve and reimburse for major purchases.

Mentor Responsibilities

Next to the students, mentors are the most important members of the team. They enable and inspire the students to do more than most people expect of high school students. They teach and guide students in all parts of the designing, building, marketing, and operating of the robot. Mentors have a number of important responsibilities but also reap incredible rewards.

1. Mentors are responsible for inspiring students in science and technology.
2. Mentors are responsible for motivating and engaging students in meaningful activities in the designing, building, marketing, and operating of the robot.
3. Mentors are responsible for creating an atmosphere of trust and respect. Mentors are expected to show trust and respect to every student while fostering the same trust and respect in themselves. This may include being a confidant for students who are looking for a trustworthy, mature person to share personal information with.

4. Mentors are responsible for creating an atmosphere of open communications where students feel free to think independently, voice their opinions, and take risks as long as they do not impose a safety hazard. Mentors are expected to be active listeners and they are expected to make sure that everyone understands what is being said or what is being decided.
5. Mentors are responsible for making sure that students are completing tasks on time. This includes providing a timeline for activities and trusting students to complete tasks while holding them accountable for their assignments.
6. Mentors are responsible for making sure that a safe environment is maintained and safety procedures are being followed. If there is an unsafe condition, mentors must step in and restore safety to the situation.
7. Mentors are expected to be positive examples to the students. This includes controlling offensive language as well as following safety procedures such as wearing safety glasses and using power equipment properly.
8. Mentors must strive to maintain a positive attitude and an optimistic outlook at all times.
9. Mentors are expected to facilitate instruction and have students do as much of the work as possible. They are to coach, teach, and observe students while remaining ready to step in as needed.
10. Mentors are encouraged to read the FIRST Mentoring Guide available at the FIRST website (www.usfirst.org).
11. Mentors must remain alert to vulnerable situations that they could be placed in. They are not to transport students in their own vehicles without written parental permission. They are not to be alone with a student in a vehicle or in a hotel room unless there is no other alternative.
12. Refer any student behavioral problems to the Faculty Advisor(s).

Parent/Guardian Responsibilities

The parents/guardians of our students are an important part of the success of our team and are considered to be team members. Parents/guardians do not have to be engineers to qualify to be mentors. Whether they are mentors, part of a support group, or spectators at competitions, they fill a vital role. There are a number of responsibilities that each parent has as a part of their student being on the team.

1. Parents/guardians are responsible for attending all parent meetings. These meetings are normally held at the beginning of the school year in order to provide information about the team. Additional meetings may be called at other times during the year.
2. Parents/guardians are responsible for providing transportation to make sure that students are on time for meetings, build times, and events. Timely transportation must also be provided so that students have rides home afterwards.
3. Parents/guardians are responsible for signing and returning permission slips, waiver forms, and other legal documents on a timely basis for their students under the age of eighteen.
4. Parents/guardians are responsible for providing the team Faculty Advisor(s) with accurate medical information for their student.
5. Parents/guardians are responsible for providing telephone numbers where they can be reached in case of an emergency.
6. Parents/guardians are responsible for providing a general contact phone

number and a dependable email address for the team to provide them with information about upcoming events and team opportunities. Email is the primary and often the only method of contacting members of the team. Parents/guardians need to check their email often and communicate any correspondence with their families. If email is not available, a responsible email partner will be assigned to the family to give them a call when there is anything that they would have received through email.

7. Parents/guardians are responsible for the conduct of their child until the age of eighteen. If there is a violation of the student code of conduct by their child that results in a liability, parents may be held liable. If there is a violation of the code while on an out-of-town trip, parents will be responsible for providing transportation, at their cost, to return the student home.
8. Parents/guardians are encouraged to attend events and provide support for the team. These events may be competitions, team gatherings, or public events.
9. Parents/guardians are encouraged to keep up-to-date with what their child is working on with the team and the progress that the team has made. Parents should stop in at the build site from time to time to see how things are going.

11. Parents/guardians are encouraged to become team mentors. Becoming a mentor adds additional responsibilities but is a very rewarding experience.

Communications

It is recognized that proper communications are essential for seamless club functions and operations. One central person should be responsible for receiving and disseminating information from and to all levels of participants. Therefore, the following protocol will be followed:

1. The Faculty Advisor(s) will establish him/herself with FIRST to be the main contact person and disseminate information received from FIRST to the appropriate parties.
2. The Faculty Advisor(s) will direct the appropriate club leadership to disseminate information to the club members as deemed necessary. Meetings will either be called by the Faculty Advisor(s) or by club leadership under the direction of the Faculty Advisor(s).
3. It is the responsibility of the students to check their email daily to check for important information, and respond to the requested action by the deadline provided.
4. In the event a telephone fan out is activated, it is everyone's responsibility to see that the next person(s) in the fan out is contacted to ensure completion of the fan out.
5. Agenda items for general meetings will be communicated via email to the Faculty Advisor(s).

Travel Qualifications

Due to the large number of members on the Desperate Penguins Robotics Team and funding limitations, there will be occasions where the whole team may not be able to go to an event. These events will instead be attended by members of the travel team. This team will be comprised of students and mentors in the Desperate Penguins Robotics Team. These travel team members will have qualifications, responsibilities, and rewards for their involvement on this team.

1. In order to be considered for a position on this travel team, a student must demonstrate a high level of dedication to both the ideals of FIRST and of the Desperate Penguins Robotics team.
2. They must play a part in the progress of their group as determined by the student mentor and any adult mentors of their group.
3. Students must comply with all attendance procedures as stated in the attendance section of the handbook. No student is automatically included on the travel team. Members must comply with regulations and guidelines in order to earn a spot on the travel team.

Student Contract

The following contract is designed to ensure every student, mentor, and parent fully understands the expectations of the Desperate Penguins First Robotics Team. In consideration of the benefits received as a member of the team, I hereby agree to the following:

1. I have read and will abide by the entire student handbook and understand the expectations as a member of the team.
2. I understand and will abide by the safety rules that must be followed during the process of building, designing, and operating a robot.
3. I understand the consequences of any prohibited behavior.
4. I understand the development of a robot is a cooperative learning experience of both Mentors and students.
5. I understand the responsibilities of all student leaders and will respect their authority.
6. I agree to be held accountable for my attendance and expected level of contribution at all meetings and events.
7. I will be held accountable for my productivity as a member of the team.
8. I will support the ideals of First Robotics and the goals of the Desperate Penguins Robotics team.

I have read the entire contract and agree to all guidelines and expectations set forth in the team handbook.

Student

Date

Parent

Date