**Team 159 Handbook**

Introduction to the team here

Elections will be held after competitions each year in order to determine Captains for the following year. The elections will consist of both team and mentor input in order to find the best candidate. These specific rules are spelled out under the captain’s portion of the team organizational structure.

Any team member may be asked to leave the club at any time. Being part of this team is a privilege not a right. The removal of a team member is subject to teacher, mentor and captain input.

The competition is a part of the robotics team that shall be regulated by the captains and teachers. The right to attend competition will be subject to the amount of effort shown by the team member, their attitude, and importance to the overall robotics team. This will be measured by the teachers and captains and is subject to their approval of each student.

Insert the guidelines and code of conduct that was created this year here.

**Team Organization Structure:**

The team will be broken into departments based on the following structure.

Points (pts) will be awarded based on the conditions laid out below. They are subject to the approval of captains, teachers, mentors, and department heads.

A team member’s rank is determined by the highest rank they have achieved. Each team member is expected to listen to anyone who outranks them and follow orders given to them. A rank in a specific area may be overcome (example a Rank 3 student who is only rank 1 in welding is expected to listen to and obey a rank 2 welder while working with welding) while working in that area. Team members of equal rank are expected to cooperate and if necessary approach a higher rank in order to solve disagreements.

Each team member is expected to listen to captains and mentors and follow orders. Any order from a teacher is to be taken as the most important. If any team member finds fault in the system or would like to request a change to the overall structure of the team they may approach them team captains or teachers.

**Captains**

The role of the captains is to lead the team and build a successful plan for each season. The captains are elected officials of the team and represent the team at events. The captains need to communicate with mentors and teachers in order to ensure the continuation of the team. Each Captain has a specific role in the ability of the team to perform, and may be removed at any time based on team and mentor input.

**System Engineer (Rank 5): Greatest Score on the team Decided after Season**

* Acceptance by Team (as decided by elections)
* Leadership Ability (Vote by Mentors and Teachers)
* Ability to effectively design and assemble a robot (Vote by exiting leadership)

**Project Manager (Rank 5): Greatest Score on the team Decided after Season**

* Acceptance by Team (as decided by elections)
* Leadership Ability (Vote by Mentors and Teachers)
* Ability to effectively manage and control a schedule (Vote by exiting leadership)

**Programming Rankings**

**Noob (Rank 0): Minimum 20 pts to Achieve**

* Can follow tutorials to install Eclipse, Driver Station, update firmware for the CAN devices
* Proficient enough with C++ to understand what an individual function is doing, and to debug it, if necessary.
* Potential to improve (determined by department head)
* Character (as determined by team captains)
* Minimum 5 hrs/week at robotics (2 hrs during preseason)

**Functionally Proficient (Rank 1): Minimum 18 pts to Achieve**

* Given a simple desired effect, can write a function to achieve that effect.
* Can avoid side effects, memory leak, and excessively long execution times.
* Can comment code.
* Potential to improve (determined by department head)
* Character (as determined by team captains)
* Minimum 7 hrs/week at robotics (2 hrs during preseason)

**System Basic (Rank 2): Minimum 20 pts to Achieve**

* Can figure out what a subsystem is doing, and debug it or add an additional public function, make other slight modifications as necessary.
* Potential to improve (determined by department head)
* Character (as determined by team captains)
* Minimum 10 hrs/week at robotics (3 hrs during preseason)

**System Lead (Rank 3): Minimum 18 pts to Achieve**

* Can, given a set of physical components, a controller, and required public functions, create an organized subsystem with the necessary public functions, and demonstrate it in a unit test.
* Potential to improve (determined by department head)
* Character (as determined by team captains)
* Minimum 15 hrs/week at robotics (3 hrs during preseason)

**Project Integration (Rank 3): Minimum 21 pts to Achieve**

* Can, given an existing robot project and existing subsystem code, add the subsystem to the main project
  + Side effects (subtract points for errors)
* Can debug the main robot project.
* Leadership Ability (determined by department head)
* Character (as determined by team captains)
* Minimum 17 hrs/week at robotics (4 hrs during preseason)

**Programming Guru (Rank 4): Chosen after Competition by greatest score**

* Can design a clear and consistent organizational structure that includes necessary subsystems and which physical components they can directly control.
* Can write, given working code for multiple subsystems, a single project that uses all of them, and is easy for the driver to control.
* Programming Ability (determined by mentors)
* Leadership Ability (as determined by team captains)
* Minimum 30 hrs/week at robotics (5 hrs during preseason)

**Controller Certification (Side Certifications for each device)**

Can program something that isn't the RoboRio, and correctly set up a way for the RoboRio to get data from that other device. I would not recommend a vision processing attempt if no one can do this before the season starts.

**Shop Rankings**

**Shop Grunt (Rank 0): Minimum 22 pts to Achieve**

* Understanding of shop safety and procedures
* Ability to read a part designed by CAD department and a hand drawn part
* Potential to improve (determined by department head)
* Character (as determined by team captains)
* Minimum 5 hrs/week at robotics (2 hrs during preseason)

**Coolant Boy (Rank 1): Minimum 26 pts to Achieve**

* Ability to zero quickly
* Ability to true a piece
* Predrill and accurately drill hole
* Potential to improve (determined by department head)
* Character (as determined by team captains)
* Minimum 10 hrs/week at robotics (2 hrs during preseason)

**Mill Expert (Rank 2): Minimum 21 pts to Achieve**

* Ability to manufacture piece from design with accuracy (turner’s cube)
* Ability to use end milling to create channel
* Using Boring bar to create accurate hole
* Machine Ability (determined by department head)
* Character (as determined by team captains)
* Minimum 15 hrs/week at robotics (3 hrs during preseason)

**Lathe Apprentice (Rank 1): Minimum 21 pts to Achieve**

* Turn down a solid axel
* Drill a hole through a piece
* Ability to create spacers
* Potential to improve (determined by department head)
* Character (as determined by team captains)
* Minimum 10 hrs/week at robotics (2 hrs during preseason)

**Turner (Rank 2): Minimum 24 pts to Achieve**

* Ability to create a ring accurately
* Creating a wheel to specifications
* Machine Ability (determined by department head)
* Character (as determined by team captains)
* Minimum 15 hrs/week at robotics (3 hrs during preseason)

**CNC Trainee (Rank 1):**

* Ability to not destroy the CNC while around it
* Ability to load a program onto CNC and execute
* Must be at least Rank 2 in another shop specification
* Potential to improve (as determined by team captains)
* Character (as determined by team captains)
* Minimum 10 hrs/week at robotics (2 hrs during preseason)

**CNC Controller (Rank 2): Minimum 22 pts to Achieve**

* Ability to create and run CNC program with multiple bits and intricate pattern
* Machine Ability (determined by department head)
* Character (as determined by team captains)
* Minimum 15 hrs/week at robotics (3 hrs during preseason)

**Welding Apprentice (Rank 1): Minimum 24 pts to Achieve**

* Ability to lay a successful weld line
* Ability to create a weld on 90 degree angle
* Ability to weld 2 pieces at 180 degree angle
* Character (as determined by team captains)
* Potential to improve (as determined by team captains)
* Minimum 10 hrs/week at robotics (2 hrs during preseason)

**Welding Expert (Rank 2): Minimum 17 pts to Achieve**

* Complex welds such as eye bolts or multiple welds
* Leadership Ability (as determined by team captains)
* Character (as determined by team captains)
* Minimum 15 hrs/week at robotics (3 hrs during preseason)

**Woodshop Trainee (Rank 1): Minimum 20 pts to Achieve**

* Ability to handle basic electrical tools
* Ability to assemble a pattern
* Potential to improve (determined by department head)
* Character (as determined by team captains)
* Minimum 10 hrs/week at robotics (2 hrs during preseason)

**Prototyper (Rank 2): Minimum 22 pts to Achieve**

* Ability to effectively communicate with other team members to create designs
* Ability to plan and manufacture prototypes of the design agreed upon
* Leadership Ability (determined by department head)
* Character (as determined by team captains)
* Minimum 15 hrs/week at robotics (3 hrs during preseason)

**Shop Expert (Rank 3): Minimum 31 pts to Achieve**

* Lathe Ability
* Mill Ability
* CNC Ability
* Woodshop Ability
* Machining Ability (determined by shop head)
* Recommendation (Given by mentor or teacher)
* Leadership Ability (as determined by team captains)
* Minimum 20 hrs/week at robotics (5 hrs during preseason)

**Shop Head (Rank 4): Chosen after competition by Greatest Score**

* Appointed by team captains.

**Electronics Rankings**

**Ground Connection (Rank 0): Minimum 28 pts to Achieve**

* Knows the difference between AC and DC voltage and can explain both in detail
* Knows in detail how power circuits work
* Knows the form and function of all electronics tools (except crimpers and soldering items)
* Knows the basic organization system of the electronics cart and can follow it
* Potential to improve (determined by department head)
* Character (as determined by team captains)
* Minimum 5 hrs/week at robotics (2 hrs during preseason)

**Electronics Basic (Rank 1): Minimum 20 pts to Achieve**

* Can make a cable using various crimping tools (not soldering) using instructions given by department head
* Knows the form and function of basic FRC control system parts (RoboRIO, Power Distribution Panel, wireless router, Voltage Regulator Module, Pneumatic Controller Module, Motor Controllers, Motors)
* Potential to improve (determined by department head)
* Character (as determined by team captains)
* Minimum 10 hrs/week at robotics (3 hrs during preseason)

**Electronics Apprentice (Rank 2):**

* Knows the form and function of (encoders, optical sensors, LiDAR, cameras, accelerometers, REV Moreboard, breakout boards, limit switches
* Has basic soldering skills
* Is able to build a basic 4 drive motor electronics board using PWM controllers
* Knows in detail how signal circuits and busses work
* Electronics Ability (determined by department head)
* Character (as determined by team captains)
* Minimum 15 hrs/week at robotics (4 hrs during preseason)

**Journeyman (Rank 3):**

* Knows how to wire and what cables to use for advanced control system parts
* Is able to work well with other departments to have mounting parts manufactured for electronics
* Knows how to wire and mount every control system part and the specific requirements of each
* Electronics Ability (determined by mentors)
* Leadership Ability (as determined by team captains)
* Minimum 30 hrs/week at robotics (5 hrs during preseason)

**Electronics Expert (Rank 4):**

* Is able to create a complete advanced electronics system on a robot (such as on robot Artemis, 2016)
* Is able to successfully work as the Electronics department head for at least one season
* Is able to manage and keep the current organizational system for the electronics cart
* Programming Ability (determined by mentors)
* Leadership and Teaching Ability (as determined by team captains)
* Minimum 30 hrs/week at robotics (5 hrs during preseason)

**CAD**

**Design and Assembly Team**

**Drive Team**