ROBOTICS

a newsletter about IMSA's FRC team

TEAM #2022

TITAN ROBOTICS

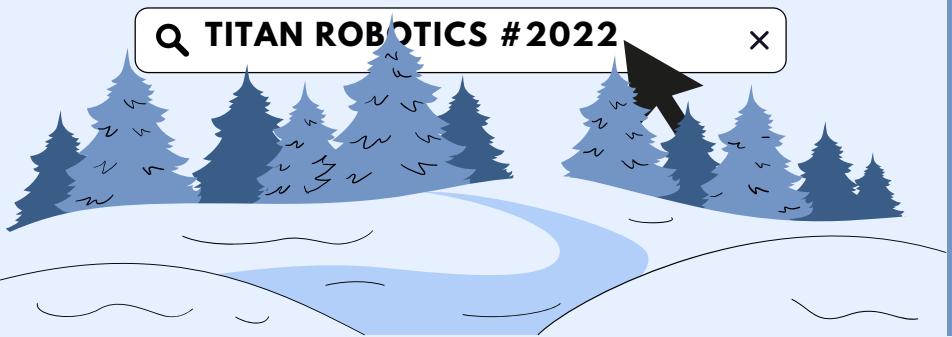
IN THIS ISSUE

By the FRC Business Team

FRC Team 2022, Titan Robotics, is a high school robotics team made up of students from the Illinois Mathematics and Science Academy (IMSA). We compete in the FIRST Robotics Competition (FRC) program, which teaches our members technical skills, such as mechanical, programming, electrical, and Computer Aided Design (CAD). Team members also have the opportunity to develop business, leadership, and communication skills.

Reflective of our diverse student body, our team aims to provide equal opportunities for STEM training, regardless of race, gender, experience, or any other factor.

Keep Reading to Learn More!



IMSA
Illinois Mathematics and Science Academy

Intersession

Each year schools around the world compete in the First Robotics Competition. Teams of Students are encouraged to work together to design, make, and program a robot for the annual field game. This year the FRC is partnering up with the Arts to bring the field game CRESCENDO. Teams of three form an alliance and are required to launch notes into speakers or amps to gain points. In the last twenty seconds of the match, teams rush to get on their stage while a human player tosses a note for additional points. The team with the most points wins the match.

Illinois Math and Science Academy is proud to announce its involvement with FRC to form the Titan Robotics. Each Titan Robotics team member is required to attend ON15 for their Intersession. This is a two-week process where members build a prototype for a certain aspect of CRESCENDO. Groups are broken down into five categories, shooter, intake and storage, climb, drivebase, and amps score. Each group has to build a functional prototype for the final design of FRC. Members get to pick which function of the robot to work on. After brainstorming, designing, and constructing, groups show the whole team their design. Picking one or two most promising prototypes of each category, the final design is an amalgamation.

These past weeks, Titan Robotics has achieved a great quantity of tasks. The final design is written. Each category has a functional prototype. The programming team is working on a code for the robot. Two members have been selected to be the human players for competition. Lastly Titan Robotics will also be starting a YouTube series. Many tasks have been fulfilled but there is still much to be done. We wish you the best of luck Titan Robotics.

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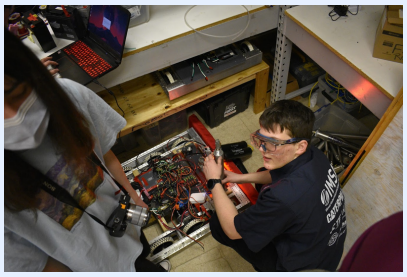
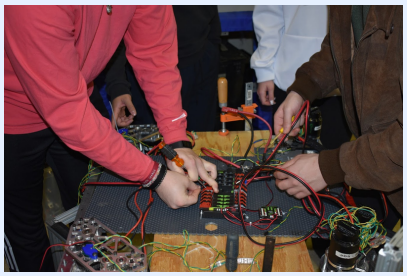
Mechanical and Electrical

During intersession, the mechanical team got to building the prototypes the team brainstormed and discussed together. The main goal was for members to bring their ideas to life and at the end collaborate to find a way to bring these prototypes together. Other members of mechanical were working on building inverse swerve modules to replace the current swerve modules on the robot. Through trial and error, the team found a gear ratio that run the robot much faster and could allow for the swerve modules to be easily reversed from inverse to normal. Additionally, this year we focus a lot on lab organization and cleaning. Team members built and found ways to store tools and supplies for a more efficient lab!



On the other hand, the electrical team has been setting up kick bots, new prototypes, and motors to get testing up and running, and trying to get ready for the upcoming season while teaching new members the ropes. Additionally, they have also been working very hard towards adjusting the size of the belly pan and electronics to fit their new dimensions. It was once 29 by 29 inches but now Electrical is working on downsizing it to 24 by 24 inches to improve the climbing aspect of the game. Still, it comes with its challenges of figuring out where they're going to put all of the electrical components with such little space. But with a bigger drive base that in itself can have other advantages, so in the end, it is smaller and better. Lastly, they have been working towards going through and improving the organization of the lab, even if it means going through 15-year-old parts.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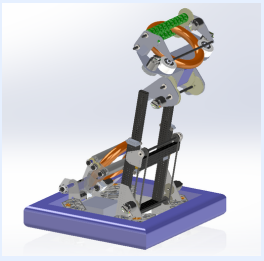
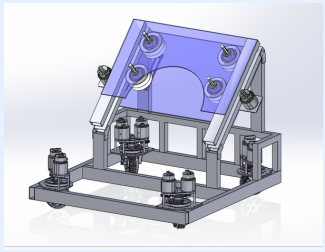
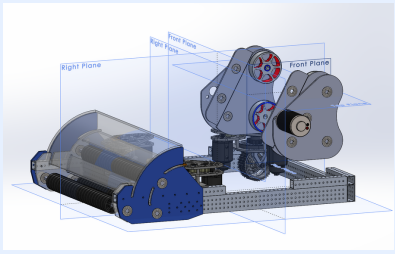
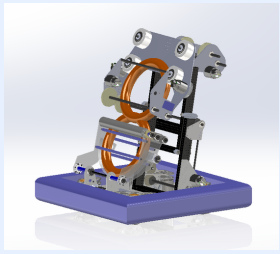
Design Integration

Our design integration team was busy during intersession CADing up final robots to have an idea of what the robot would look like and how the prototypes could work together and create a functioning robot. Currently as they continue to CAD, other members are working to figure out how an under and over the bumper robot could look like and whether it would use inverse or normal swerve.



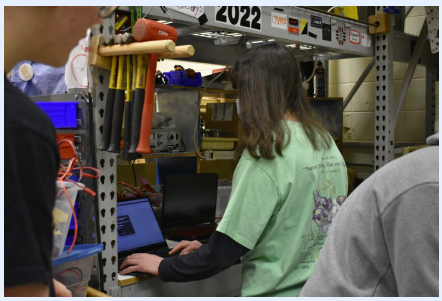






Programming

Our programming has been working hard on programming the prototypes students have been finishing such as the intake, shooter and slam-dunker subsystems. Other members have been working on tuning the swerve drive modules and inverted. This allowed for the mechanical members working on the swerve modules to seek out problems to fix to ensure the modules run perfectly. Additionally, to detect the notes, game elements, members have created a histogram of its color and only selecting pixels in that range and detecting note distance using our Inter RealSense depth sensing camera.



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Operations

The outreach team worked to plan various events, such as collaborations with the diverse clubs on campus, connecting with the Promise program, and reaching out to various schools to teach kids about STEM through the use of STEM kits. These events aim to engage students from different backgrounds and age groups, fostering a passion for STEM education. Some upcoming events we have planned and are looking forward to hosting are our collabs with the Society of Women Engineers @ IMSA, teaching promise students about robotics and visiting middle schoolers. Additionally, the team held our DEI training at the end of intersession. We were happy to share and enlighten our team on FIRST's diverse and inclusivity goals for a more inclusive future!

This January, the finance team started to plan out competition logistics through reaching out to sponsors through emails, contact forms, and phone calls. A financial donation or an in-kind sponsorship can provide resources such as engineering materials/tools, services, mentorship/lab tours, and/or food. All these count toward the success of the team in competitions and various outreach events.

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What's Happening in Current Robotics Research?

Biohybrid robots, a fusion of biology and mechanics, have gained a lot of new attention as a new field of robotics.
Recently, researchers in Japan created a two-legged biohybrid robot. In this case, muscles are used as actuators, in a way that takes advantage of muscles. Researchers designed a robot that mimics human gait and operates in water that has fine and delicate movements such as pivots and sharp turns. When the muscles are Zapped with electricity, the muscle is contracted, lifting the leg up.
The robot made a 90-degree left turn in 62 seconds, naturally, in the future, researchers plan to increase the speed more efficiently as well as give joints and thicker muscle tissues to the bipedal robot for more sophisticated and powerful movements.
Read more at ScienceDaily "Scientists design a two-legged robot powered by muscle tissue"

Scan here to make a one-time parent donation! Even $1 helps!

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THANK YOU FOR READING AND HAVE A HAPPY SPRING!

Look out for our February issue next month!