UCSD StudentTECH 2020

Robotics Technology for Middle School Students

Sponsored by the San Diego Supercomputer Center and UCSD College Explorations at the University of

Blast Of, Space Crew!
Beginning Robotic Adventures with Lego EV3

Monday- Friday, August 17-21, 2020

LEGO® ROBOTICS SPACE CHALLENGE...Going to space won't be easy! Make sure that you have a good crew with you and that all of your systems are online...Begin the launch!

Course Overview

Discover the ultimate LEGO® challenge by combining LEGO® elements with an EV3 LEGO® MINDSTORMS® programmable brick, motors, and sensors to learn mechanical design, programming, strategy, innovation, robot performance, and innovative solutions to real-world problems.

Students will work as Scientists and Engineers, immersing themselves in motivating STEM activities that develop creative problem solving, communication, and teamwork skills.

This exciting space exploration curriculum includes: the Basics of Gears, Learning Missions, Challenge Missions, and Research Projects. Each mission and project is a fun and engaging STEM learning opportunity.

Please Note: For this class, the instructor will have the most recent FIRST LEGO LEAGUE robot game for students that were on or plan to be on an FLL team for the 2020 season. LEGO curriculum will be used for our July beginner class and this advanced course.

Basics of Gears: Students apply physical science and math principles to build effective robots.

Learning Missions: Students progress through seven distinct missions in which they investigate, observe, calculate, and apply their knowledge to solve specific tasks.

- Controlled Movements
- Precise Turns
- Turn Using sensor

- Detect a Color
- Detect an Object
- Follow a Line
- Detect & react

Challenge Missions: Students apply and creatively adapt programming and problem-solving skills to design and build robots to solve seven different space challenges.
- Space Challenge Rules
- Activate Communications
- Assemble Your Crew
- Free the MSL Robot
- Launch the Satellite Into Orbit
- Return the Rock Samples
- Secure Your Power Supply
- Initiate Launch

Research Projects: Students explore, plan, and develop around three fundamental challenges NASA Engineers and Scientists are trying to solve - how to ensure humans can survive in space, how humans c **Module 1: Beginning Robotics**
Level 1 – Basics of Gears
- Students apply physical science and math principles to build effective robots.

Level 2 – Learning Missions
- Students' progress through nine distinct missions in which they investigate, observe, calculate, and apply their knowledge to solve specific tasks.
  - Controlled Movements
  - Precise Turns
  - Turn Using sensor
  - Detect a Color
  - Detect an Object
  - Follow a Line
  - Detect & react
  - Intelligent Movements
  - Calibrate Color Sensor

Level 3 – Open Ended Activities
- Complete A Maze
- Robot Revolution: EV3 Robot Dance Off

Module 2: Introduction To *FIRST*® LEGO® League
- Students will be introduced to the FIRST philosophies of Gracious Professionalism and Coopertition through the Core Values of Discovery, Innovation, Impact, Inclusion, Teamwork, and FUN!
- Students apply and creatively adapt programming and problem-solving skills to design and build robots to solve seven different space challenges in a robot game.

    - Activate Communications
    - Assemble Your Crew
    - Free the MSL Robot
    - Launch the Satellite Into Orbit
    - Return the Rock Samples
    - Secure Your Power Supply
    - Initiate Launch
- Students explore, plan, and develop around three fundamental challenges NASA Engineers and Scientists are trying to solve.
    - How Can Humans Survive in Space?
    - How Do We Generate Energy for Human Outposts?
    - How Can Robots Help Humans Explore Space?

Prerequisites: None required. This course is designed as an advanced opportunity to building and programming robots.

Instructor: Lori Holland, San Diego Unified School District

About Lori Holland: Lori has been teaching Science, Technology, and Engineering in SDUSD for the last 19 years, 15 of which have been at Marston Middle School. She has been teaching LEGO® MINDSTORMS® robotics for the last 9 years and coaching various Jr. FLL and FLL teams for the last 4 years. Her most recent FLL team won a First-Place trophy and a Global Innovation nomination for their research project at the FLL Championship at Legoland.