



## SUMMER ENRICHMENT ACADEMY LEGO® EV3 (AGES 11-14)

### Who: (11-14 year olds)

Expand your creative interest in LEGO® building elements and learn technical fundamentals of programming and construction!

### What you will learn

Students will merge their creative interest in LEGO® TECHNIC building elements with their “technological lifestyles.” Participants will use the LEGO® EV3 technology to design, construct and program robotic solutions to complex engineering challenges. Input from sensors will permit robots to autonomously navigate around obstacles or retrieve objects. Students will leave with an understanding of the relationships and common themes that connect mathematics, science and technology, and they will be able to integrate these principles into their everyday life. Participants will be using an iconic programming language. This software, combined with the planned curriculum, creates a fun, fast-paced and exciting introduction to robotics! LEGO® EV3 is facilitated by Rensselaer undergraduate students under the direction of professional Rensselaer faculty and staff.

- Day 1 - Intro to Robotics & EV3 Software
- Day 2 - Intro to Sensors
- Day 3 - Activities using Sensors
- Day 4 - Work on Final Challenge
- Day 5 - Final Challenge & Presentation to Parents

### REGISTER AT:

Summer@Rensselaer

518-276-6809

<http://summer.rpi.edu/>

### WHEN:

JULY 23 – JULY 27, 2018

1 WEEK FULL DAY

8:30AM – 4:00PM

### WHERE:

RPI CAMPUS

### FEE:

\$525 PER STUDENT

**MAX 24 STUDENTS**



**Rensselaer**

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**CIPCE**  
Center for Initiatives in Pre-College Education

## Sample Program Outline:

### Program Objectives

- Develop teamwork skills.
- Basic instruction following, programming, and organization skills.
- Strengthen problem solving and design skills.
- Develop ability to move between verbal and symbolic languages and representations.
- Expose students to other relevant technologies (research robotics, robotics applications in Humanities, Healthcare, Military, Commercial etc.) to raise awareness and excitement levels.
- Build teams where every member has both a specialty and a full range of experiences.

## Daily Agenda

### Day 1

- Icebreaker
- Introduction power point
- File organization preparation
- Build time
- Snack ~(10:30am - 10:45am)
- Introduction to EV3 software
  - Robot walk activity
- Lunch ~(12:30pm - 1:00pm)
- Day 1 activity 1 - maze challenge: Using move, steer and custom blocks to navigate through the maze
- Introduce while loop-square bot
- Introduce switch statements
- Introduce port view (?)

### Day 2

- Introduce sensor blocks
- Introduce touch sensor
- Day 2 Activity 1-Relay Race Using Bumpers on both ends of robot
- Snack ~(10:30am - 10:45am)
- Introduce Color Sensor Have them find out color values using worksheet
- Lunch ~(12:30pm - 1:00pm)
- Day 2 activity 2 - color race. Following lines of different colors

- Introduce Communication with multiple EV3 units using Bluetooth
- Day 2 activity 3 – blue tooth remote Use their robot as a remote to control another group’s robot. Compete with the instructors. Use motor encoders to control speed
- Use Robo-Log to leave comments & cleanup

### Day 3

- Review while loop and switch statements
- Introduce ultrasonic sensor
- Day 3 activity 1 - hand follower
- Snack ~(10:30am - 10:45am)
- Build the Pen Bot attachment
- Hand follower with the pen attachment
- Lunch ~(12:30pm - 1:00pm)
- Day 3 Activity 2 : Infrared Sensor Hand Follower
- Day 3 Activity 3 : Improve Robots to survive bumping / Bumper Cars
- Jeopardy Game (Questions about Robots)
- Use Robo-Log to leave comments & cleanup

### Day 4

- Introduce final challenge - Self Driving Car
- Work on final challenge. Building claw. Programming
- Use Robo-Log to leave comments & cleanup

### Day 5 -

- Finish working on final challenge
- Preparing for final presentation
- Final presentation to parents
- Clean up