

# Coding Robots STEM Course

An interdisciplinary STEM learning experience promoting 21st century skills like critical thinking, problem solving, computational thinking and more.

CoderZ™  
by intelitek▶▶



## Coding Robots powered by CoderZ

Introduce students to the concepts of Robotics and Coding with CoderZ, an online learning environment for programming real and virtual robots.

The Coding Robots STEM Curriculum brings your students up to speed with code and robotics in no time. This 45 hour program will teach your students to solve STEM problems through code, using math and engineering to overcome challenges. CoderZ helps get teachers started with robotics and bring the interdisciplinary value of STEM into the classroom. CoderZ uses engaging simulation so students will have immediate life-like feedback and can work from any computer, in class or at home, making sure all students get to code their robot even when time and resources are limited.

- ✔ Log in from anywhere, anytime
- ✔ Code in visual (block) or text editors (Java)
- ✔ Run in simulation or with hardware
- ✔ CSTA and NGSS aligned
- ✔ PBL approach
- ✔ Flipped classroom ready
- ✔ Track student progress and achievements

*Coding Robots is developed with Bloom's taxonomy in mind and is a learning environment focused on skills and higher order thinking.*

*The activities focus on the cognitive domain while constructing and establishing knowledge through different levels of engagements.*

*Coding Robots teaches your students to apply STEM knowledge, and to analyze, synthesize and evaluate while working in teams to solve different challenges and puzzles.*

*Students acquire relevant STEM vocabulary, practice methodologies, categorize and set criteria as a means to evaluate or apply critical thinking.*

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## Coding Robots Course Outline

The Coding Robots course (45 hours) brings an interdisciplinary STEM learning experience to your classroom while promoting 21st century skills such as critical thinking, problem solving, computational thinking and more.

### Week 1 - What Are Robots?

Learn what makes up a robot and how they are used to solve problems in industry, medicine and even at home. In the first week, students write simple computer programs and run simulations. Students become comfortable with logging onto CoderZ, writing simple computer code and running their simulations. Students will learn to analyze and debug programs.

### Week 2 - Driving Lesson

Driving a robot is no simple task. We will learn how to create and control the movement of robots by controlling its motors through basic code. Students will vary the power, steering, and duration parameters to control the robot's motion. Students will learn to use pseudocode to plan their computer programs. They will use repeat loops and sensor feedback to control the robot's motion.

### Week 3 - Navigation

Use geometry, math, encoders and loops to see how you can accurately navigate your robot and bring it home. Students use the compare values block to control the motion of the robot using feedback from the encoders. Geometry calculations, distance calculations and other math are used in exercises.

### Week 4 - Sensors

Driving the robot around is great. Sensing what's around it and reacting to it is even better. We will learn about controlling distance and using touch and gyro sensors to avoid obstacles. Week 4 will start by learning to use variables. Then use variables to record encoder values to make calculations about the environment.

### Week 5 - Control

Learn about ultrasonic and gyro sensors and take control of your robot. This week we will cover the simplest way to control the robot - a two-level controller. But two-level control can lead to errors due to robot inconsistencies. So the students will learn about three-level control and proportional control to overcome such errors.

### Week 6 - Visual Sensors

You are now ready for variables, state machines and three-state controls. With these you can use light sensors to follow lines and much more. This week, students will learn to use the color sensor. We can use the color sensor to identify visual features on the surface, and use these features as a navigational aid.

### Week 7 - Advanced Control

Overcome obstacles using advanced coding techniques and control best practices. Tweak and tune your code to perfection. This week, students will use a proportional line tracking algorithm. Students will also combine line tracking programming with multiple sensor outputs to improve the performance of the robot.

### Week 8 - Advanced Sensing

Search for objects using scan techniques and move them using a manipulator. The projects this week involve navigating mazes and scanning an area to find an object. We will learn about and use Boolean logic and Boolean operators. We will be using random number generators to assist in scanning algorithms. Students will compare various sensor inputs to find the best information.

### Week 9 - Conclusion

Time to put those mad skills to the test. Face the challenge and put all you've learned into practice. This week students will solve several advanced missions. Students will be required to synthesize everything they have learned so far in the course. Compete with your friends to see whose solution works best.

## Start working with CoderZ now!

For more information visit [www.GoCoderZ.com](http://www.GoCoderZ.com)

or contact us: [CoderZ@intelitek.com](mailto:CoderZ@intelitek.com)

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