

G-CODERZ CYBER ROBOTICS 102



www.gteceducation.com.sg

Course Overview

Cyber Robotics 102 (CR102) is a continuation of the Cyber Robotics 101 course. This new course teaches STEM and coding topics using gamification and a physically based environment. CR102 introduces autonomous systems, teaches scanning and mapping the environment, error correction methods, and different system control algorithms. By the end of the course the students will understand the physics forces acting on robots and their influence on the robot performance (kinematic and dynamics), and be capable of controlling and programming a robot that can interact with objects around it and can safely navigate through different changing environments.

Entry Requirement : G-CoderZ Cyber Robotics 101 knowledge

Course Duration : 15 hrs.

Mode of Learning : Face to Face Training

Course Content

Module 1: Plains & Hills 1

- Understand the new physical environment
 - Familiarity with Ruby - CR102's innovative robot
- Familiarity with different types of motors
- Understand the new motor power block
- Embed the concepts of speed, acceleration, deceleration
- Newton's second law: more power means greater acceleration
- Embed the concepts of momentum and braking distance
- Login to G-CoderZ and complete basic navigation missions

Module 2: Plains & Hills 2

- Newton's second law: more power means greater acceleration
- Newton's second law: more mass means lower acceleration
- Familiarity with gravitational force
- Understanding gravitational force's impact on driving the robot uphill

Module 2: Cruise Control

- The need to limit Ruby's speed
- Cruise control systems
- Control systems - open loop and closed loop
- Conditional programming: "if/else" block
- Loops Programming: "Repeat forever" loop block
- New movement block: "set wheel speed"

Module 4: Dangerous Curves 1

- The Gyroscope sensor
- Learning the different types of turns that the robot can perform and how to execute them
- Understanding the idea that precision is required for accurate navigation
- Understanding that speed and accuracy are inversely related
- The "Drive Distance" movement block
- Using Explore Mode to measure distances and angles
- Measuring and practicing calculations of angles

Module 5: Dangerous Curves 2

- Smooth turn practice
- The new "turn to" movement block
- Practicing different kinds of turns

Module 6: Doodling with Distance

- Applying what was learned so far and carrying out creative challenges
- Using three trail drawers
- Fun and creativity

Module 7: Touch, Avoid, Repeat

- Robots and their sensors
- Object avoidance and recognition
- The Touch Sensor
- The Ultrasonic Sensor
- Repeat Loops
- Boolean and integers data types

Module 8: Random Obstacles Ahead

- Variables of integer and double data type
- Mathematical operators: + , - , x , remainder of (modulo)
- Performing missions in non-deterministic (random) environments
- Spatial cognition – identifying the start of/end of obstacles
- Making decisions in a non-deterministic environment

Module 9: Radar Missions

- Meet Ruby's sensor ports
- Adjustment of port joints for efficient performance
- Using the top ultrasonic sensor
- Scanning the environment while keeping driving forward

Module 10: Colorful code

- The colour sensor
- String data type
- Logic operators: NOT, AND, OR
- Error correction

Module 11: Repeat Again

- Nested Repeat loops
- X-axis gyro
- Applying what was learned so far and carrying out challenges and missions

Module 12: Magnetic Manipulation

- Meeting Ruby's magnetic arm
- Applying what was learned so far and carrying out challenges and missions

Module 13: Line Following Logic

- Line following logic
- On-off control / Two-state control
- Three-state control
- Proportional control
- The color sensor - reflection mode

Module 14: A Hard Block Life

- Encoders and their utility for distance measurement
- Recalling the Y-axis Gyro
- Aligning to a line using two color/light sensors and proportional control
- Proportional gain

Company Profile

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| What We do : | G-TEC Computer Education Centre is an Information Technology company in the field of Software Training, Technology Resourcing and Knowledge Consulting. We provide Corporate Training, Project Training, and Customized Training, One to One trainings for professionals, individuals and students. |
| Who are our Customers : | We have special teaching methodologies to train people in different categories ranging from corporate clients to school level students. Over 900000 students are certified by G-TEC all over the world. We have the privilege of working with some of the most well-known companies in the world. |
| Where we are : | G-TEC Computer Education Centre is the largest computer education networks with more than 510 centers all over the world and corporate office in Singapore. We are operating in Mexico, Qatar, India, Dubai, Singapore, Kuwait, Srilanka and Iran. |
| Our Goal and Focus : | Our aim is to make IT education affordable to all sections of society through various projects associating with government's quasigovernment public and private company to reach each and every corner. Our ultimate goal is to achieve cent percentage computer literacy. We are committed to provide 100% quality training to all; our focus is to provide Quality Education World Wide. |

Our Location



Nearest MRT: Dhoby Ghaut-Exit A / Little India-Exit A/ Bencoolen-Exit B

Bus Services: 64, 65, 131, 139, 147, 166, 857

Nearest Bus Stop: Peace Centre, Stop ID: 07011

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