

Department of Robotics

Course Syllabus

Course Title: VEX-IQ GEN-2 – level-1

Prerequisites: none

Credit hours: 12

Target Audience: Trainers and Teachers

Course Description:

This is a hands-on course; trainees will be introduced to the robotics world through the VEX-IQ GEN-2 platform using the classroom kit and external sensors (such as vision & AI vision sensors). Trainees will learn how to design and program functioning robots through a methodological and sequential procedure, profound knowledge and skills that are related to blockly-coding are going to be delivered to trainees by working on the VEXcode IQ and VEXcode VR software. Furthermore, they learn a variety of mechanical design concepts and practically apply them to get different robot designs and constructions.

The Content	Duration (hour)
Programming Approach	6
Subject 1: Setup & Configuration	
<ul style="list-style-type: none"> • Install drivers • Brain firmware updating • Controller firmware updating • Indicator Lights - Battery • Brain Screen 	
Subject 2: Basic implementations Drivetrain	
<ul style="list-style-type: none"> • Mechanisms • Straight movement • Rotation • Categories and Blocks in use • Implementations 	
Subject 3: Conditional statements and Events & Parallel Commands	
<ul style="list-style-type: none"> • Working principles and mechanisms • Multi-sensing strategy • Broadcasting • Blocks in use • Implementations 	
Subject 4: Sensors: Bumper, Touch LED, Inertial, Distance, and Optical, AI Vision sensors	
<ul style="list-style-type: none"> • Working principles and mechanisms • Blocks in use • Conditional statements in action • Implementations 	
Subject 5: Tele-operated Mode	
<ul style="list-style-type: none"> • Pairing a Controller • Button and Joystick Names • Calibrating the Controller • Configuring a Controller 	

Design Approach	6
<p>Subject 1: Robot Design I</p> <ul style="list-style-type: none"> • VEX-IQ gen-2 classroom core set • The structural pieces • Basics of building wheeled mobile robots • Implementations <p>Subject 2 : Robot Design II</p> <ul style="list-style-type: none"> • Gear systems - basics • Essentials of transmission systems – basics • Arms and lifts design – basics • Building VEXRobo • Implementations <p>Subject 3: Robot Arm Motion Control</p> <ul style="list-style-type: none"> • The mechanism of moving arms and lifts • Blocks in use • Implementations 	

Course Requirements:

1. Laptop
2. VEX-IQ GEN-2 classroom Kit (it can be replaced with VEXcode VR software)

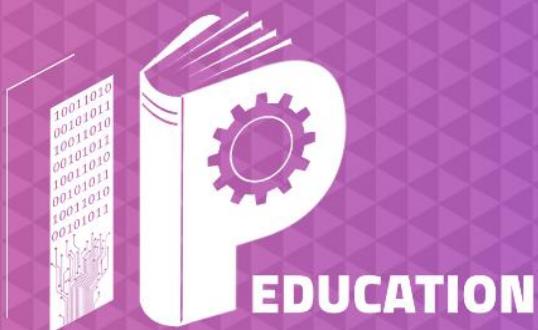
Learning Objectives: By the end of this course, trainees will:

1. Knowledge and Understanding

- A. Understand the functionalities of the components of the kit such as electronic parts and building parts.
- B. Deeply, understand the required programmatic commands for robot motion, screen, sounds, and lights functionalities.
- C. Comprehend the basic skills and concepts of mobile VEX IQ gen-2 robots mechanical design of robots such as vehicles and tanks.

2. Skills and capabilities:

- A. Design and build different mobile robots.
- B. Use many programmatic commands and programming skills to control and program mobile robots to perform various missions.
- C. Develop and effectively employ the skill of problem-solving, to find different solutions in terms of robots design and programming, many of their soft skills and thinking approaches as well.
- D. Recognize and use the basics of programming and designing VEX IQ gen-2 robots which qualifies them to step up into more advanced courses.
- E. Acquire and develop a bunch of relevant engineering skills and practices.



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