



TOT Program

Course Syllabus

Course Title: SPIKE PRIME Robotics

Prerequisites: none

Credit hours: 18

Target audience: Trainers and Teachers

Course Description:

This is a TOT course meant for trainers who are interested in teaching and training the cutting-edge LEGO Robotics platform (SPIKE PRIME) which is the substitute for the EV3 platform. Trainees are going to get specialized hands-on training based on the educational policy "STEM". Starting from the design issues such as (building-pieces uses, movement systems, structuring robots' bases ...etc.), passing by the electronic components and their uses, and not ending with coding skills (movement, variables, conditional statements, P-controller, etc.). As well as, trainers are going to assimilate sophisticated skills and concepts, all forehead mentioned will be delivered within a framework of implementations and practical applications.

The Content	Duration (hour)
<p data-bbox="517 152 946 192" style="text-align: center;">Programming Approach</p> <p data-bbox="204 255 1153 295">Subject 1: Straight Movement, Rotation and Steering</p> <ul data-bbox="352 309 826 439" style="list-style-type: none"> • Mechanisms • Categories and Blocks in use • Implementations <p data-bbox="204 495 823 535">Subject 2: Conditional statements</p> <ul data-bbox="352 548 946 678" style="list-style-type: none"> • Working principles and mechanisms • Blocks in use • Implementations <p data-bbox="204 734 1153 824">Subject 3: Force, Distance, Color, and Motor rotation Sensors</p> <ul data-bbox="352 837 946 1016" style="list-style-type: none"> • Working principles and mechanisms • Blocks in use • Conditional statements in action • Implementations <p data-bbox="204 1072 943 1113">Subject 4: Parallel Commands and Events</p> <ul data-bbox="352 1126 675 1305" style="list-style-type: none"> • Multi-thread code • Broadcasting • Blocks in use • Implementations <p data-bbox="204 1361 722 1402">Subject 5: Utilizing Variables</p> <ul data-bbox="352 1415 927 1545" style="list-style-type: none"> • The principle of variables in coding • Blocks in use • Implementations <p data-bbox="204 1601 1034 1641">Subject 6: Introduction to Control Engineering</p> <ul data-bbox="352 1655 659 1736" style="list-style-type: none"> • P controller • Implementations 	<p data-bbox="1350 152 1390 192" style="text-align: center;">10</p>

Design Approach	10
<p>Subject 1: Robot Design I</p> <ul style="list-style-type: none"> • SPIKE PRIME 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 SpikeRobo1 • Implementations <p>Subject 3: Robot design III</p> <ul style="list-style-type: none"> • Interior and exterior structures • Weight distribution and similarity • Wheel-effect • Implementations <p>Subject 4: Robot Arm Motion Control</p> <ul style="list-style-type: none"> • The mechanism of moving arms and lifts • Blocks in use • Implementations <p>Subject 5: Motion Transmission - Advanced</p> <ul style="list-style-type: none"> • Mechanisms and principles • Implementations <p>Subject 6: Gearing Systems - Advanced</p> <ul style="list-style-type: none"> • Mechanisms and principles • Types and uses • Gear ratio • Implementations 	

Course Requirements:

1. Laptop
2. Spike Prime robotics core Kit