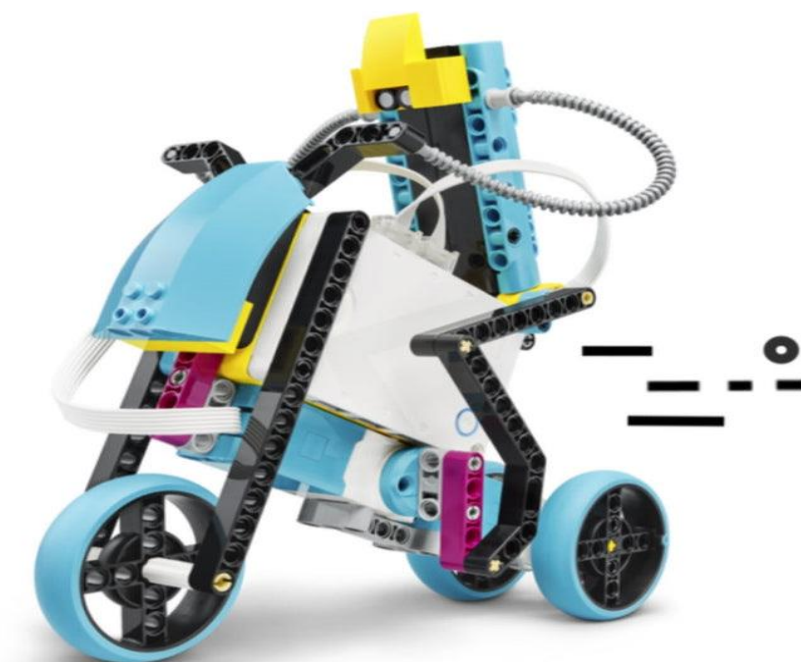


SPIKE PRIME



**TEACHER:
CERTIFIED
TRAINER**

**DURATION:
16 CLASSES (x4 LEVELS)
(1 HOUR PER CLASS)**

**MODE:
OFFLINE**

SPIKE Prime by LEGO Education is a hands-on robotics learning kit designed to teach STEM (Science, Technology, Engineering, Math) concepts through building and coding projects. It offers motorized models, sensors, and a programmable hub and supports both block-based coding and Python programming. SPIKE Prime helps students develop problem-solving skills through real-world challenges.

Course Levels

1. Junior
2. Beginner
3. Intermediate
4. Advanced

COURSE CURRICULUM

1. Robotics and Engineering Concepts

- Building mechanical models with motors, gears, and sensors.
- Understanding structural design (beams, axles, gears).
- Problem-solving through challenges (e.g., obstacle courses, racing robots).

2. Mathematical Concepts

- Ratios and proportions through gear ratios and motor speeds.
- Measurements (angles, distances, and rotations).
- Linear and circular motion with real-world applications.

3. Programming Concepts

- Introduction to block-based programming.
- Use of variables, loops, and conditional statements.
- Event-driven programming with sensors triggering motor actions.

Programming Blocks

1. Motors

- Start Motor Block: Activates motors at a specified speed or direction.
- Stop Motor Block: Halts motor activity.
- Set Motor Speed: Adjusts the motor speed.
- Set Motor Position: Moves the motor to a target position.
- Sync Motors: Runs two motors simultaneously for coordinated movement.

2. Movement

- Move Forward / Backward: Controls basic movement directions.
- Turn Left / Right: Adjusts motor control for pivots and axis turns.
- Move Distance: Configures the robot to move a set distance.
- Set Rotation Angle: Rotates the motors to a specific angle.

3. Light & Sound

- Set Light Color: Changes the hub's LED to different colors.
- Blink Light: Flashes the hub's light.
- Play Sound: Outputs sound from the hub's speaker.
- Set Sound Volume: Adjusts sound level.

4. Events

- When Button Pressed: Triggers actions upon button press.
- When Program Starts: Runs code at the start of the program.
- When Tilted: Activates events based on the hub's tilt angle.

5. Control

- Wait Block: Pauses actions for a set amount of time.
- Repeat Block: Runs code multiple times in a loop.
- Forever Block: Executes code continuously.
- If-Else Block: Controls actions based on conditions.
- Wait Until Block: Holds execution until a condition is met.

6. Sensors

- Color Sensor Block: Detects specific colors and light intensity.
- Distance Sensor Block: Measures distance to objects.
- Force Sensor Block: Detects pressure on the button.
- Gyro Sensor Block: Tracks the hub's orientation and yaw angle.

7. Variables & My Blocks

- Create Variable: Stores data for use in the program.
- Set Variable: Assigns values to a variable.
- Change Variable: Modifies the stored value incrementally.
- My Blocks (Without Parameters): Encapsulate repeated code into reusable blocks.
- My Blocks (With Parameters): Include input parameters to create dynamic functions.

8. Operators

- Math Operators (+, -, *, /): Perform arithmetic calculations.
- Comparison Operators (>, <, =): Compare two values.
- Logic Operators (AND, OR, NOT): Combine conditions logically.
- Random Number Generator: Generates random numbers.
- Range Operator: Checks if a value is within a certain range.
- Join Operator: Concatenates two strings.
- Mod (Modulus) Operator: Finds the remainder of division.
- Round Operator: Rounds a number to the nearest integer.
- Absolute Value (Abs) Operator: Converts a number to its non-negative equivalent.

Class Structure

1. Introduction to Mechanical Components and Controller
 - Learn about motors, sensors, and hub usage.
2. Supervised Assembly of Robotic Models
 - Build working models with guidance from certified trainers.
3. Introduction to Programming Concepts
 - Understand the graphical programming interface of Spike Prime.
4. Programming the Robotic Models
 - Use blocks to control motor speed, light, and sensor input.
5. STEM Applications and Real-World Connections
 - Relate engineering concepts to practical use cases.

6. Hands-on Experiments and Challenges

- Explore activities like:
 - Obstacle detection with the distance sensor.
 - Color-based object sorting.
 - Gyro-controlled movement projects.