King

Recommended for Age 13 Above

OBJECTIVES

The **King Programme** is designed to offer an advanced and comprehensive educational experience through five integrated modules: **Robotics Coding, Robotic Machine Learning,** . This programme aims to deepen students' understanding and skills in **Science, Maths, Coding,** Design, and evolving technology, preparing them for future academic success and career opportunities. The highlights come from our **machine learning module** which explores how **AI works through real-world applications,** helping students understand the role and impact of AI in today's technology landscape.

SKILL ACQUIRED

- ☑ Fine Motor Skills
- ☑ Visual Spatial Awareness
- ☑ Mathematical Skills
- ☑ Pattern Recognition
- ☑ Social Skills
- ☑ Problem-Solving
- ☑ Conceptual Understanding
- ☑ Data Literacy:

EDUCATION TOOLS

SOFTWARE

- EV3 Classroom
- LEGO Education Spike Prime App
- Gearsbot App

STUDENT'S OUTCOME

- Adaptability to New Technologies
- Boost Creativity
- Increase con dence
- Foundation for future learning
- Improved Science & Mathematics
- Enhance problem solving
- Build patience and focus
- Entreprenuerial skills

LESSON OUTLINE

Theoretical Introduction

- ★ **Robotics STEM:** Introduction to Science, Math and Engineering concepts through LEGO prototypes.
- ★ **Robotics Coding:** Overview ofcoding principles applied to LEGO models.
- ★ **Games and Animation:** Learning design concepts for games and animations in computing projects.
- ★ **Machine Learning:** Trainingon thefundamentals of machine learning and real-world applications.

Construction & Visual Spatial Perception

- ★ **Visual Spatial Skills:** Learning to identify and assemble 3D LEGO pieces from 2D instructions
- ★ **Motor Skills:** Developing ne motor strength, precise object manipulation, and coordination.
- ★ Apply for Robotics Modules only

Experiments

- ★ **Logical Reasoning:** Engaging inlogic-based activities aligned with lesson objectives.
- ★ **Project Evaluation:** Analyzing andevaluating projects to meet speci c requirements.

Problem Solving Tasks

- ★ **Progressive Challenges:** Tacklingthreetasks of increasing di culty.
- ★ **Assessment:** Evaluatingproblem-solving abilities and creative thinking.

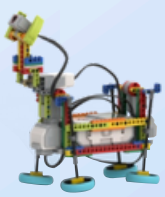
Knowledge Play

- ★ **Fun Facts:** Enhanceggeneral knowledge with science, technology, engineering, and math facts.
- ★ **Quizzes:** Testing conceptual understanding with engaging quizzes on daily topics.

Competition Model

Competition Model

Cuckoo Clock



Giraffe

Competition Model

Competition Model

Penguin

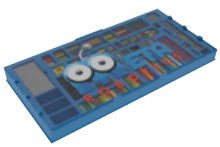
Sensor Elevator

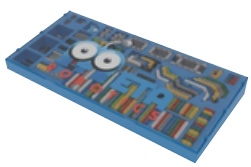
To enhance students' proficiency in robotics and coding through advanced, complex builds and programming. This programme builds on the foundation established in the Smart Robotics Coder module, introducing more sophisticated coding techniques and intricate accessories. Students will engage in challenging projects that require critical thinking, creativity, and advanced problem-solving skills, preparing them for higher-level STEM education and potential future careers in technology.Key areas of focus include advanced sensor integration, algorithm development, and real-world application of robotics principles.

ADVANCE ROBOTICS CODER

EDUCATION TOOLS


LEGO EV3 Mindstorm


LEGO Technic Tray 1


LEGO Technic Tray 2


Tablet

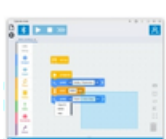
CODING


Flow Block


Output Block


Connect


Dis-Connect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PROJECTS


Insert Race


Autonomous Vehicle


Robo Trainer


Power Car


Grabber

Disclaimers

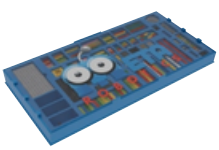
Please note that this lesson illustration represents only about 30% of the full in-class experience. In addition to the structured content, students also engage in valuable discussions and activities that enhance their learning, which are not fully captured here.

To enhance students' proficiency in advanced robotics and coding through complex builds and programming. Building on the Advanced Robotics Coder module, students will explore sophisticated coding techniques and advanced hardware, engaging in projects that require critical thinking, creativity, and advanced problem-solving. The focus includes advanced sensor integration, algorithm development, and real-world applications of robotics principles using SPIKE Prime.

SPIKE PRIME CODER

EDUCATION TOOLS

LEGO Spike Prime



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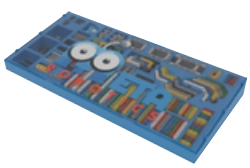
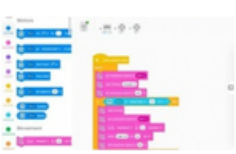


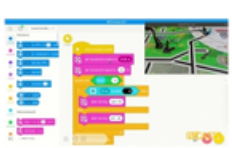
LEGO Technic Tray 2

Tablet

CODING



Movement Block



Line Follow + Colour Sensor

Motor Synchronization

Gyroscope

PROJECTS

Obstacle Course

Colour Sorter

The Crane

Ball Maze

Mobile Tank

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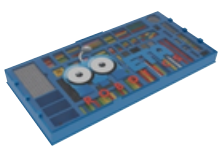
Using LEGO Spike Prime to explore artificial intelligence (AI) provides a dynamic, hands-on way for students to engage with both the fundamentals of robotics and the basics of AI. The LEGO Spike Prime kit, equipped with versatile sensors and motors, coupled with an intuitive programming environment, offers a practical platform for simulating and implementing AI concepts.
The objective of incorporating AI with LEGO Spike Prime is to introduce students to AI principles through interactive and tangible learning experiences. By building and programming robots, students can see firsthand how AI can be used to automate tasks, solve problems, and make decisions based on data.

ADVANCE ROBO INVENTOR

EDUCATION TOOLS

LEGO Spike Prime



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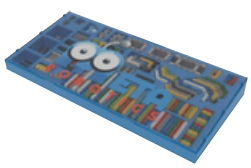


LEGO Technic Tray 2

Tablet

CODING

Prediction: Stand

Prediction: Lie-down

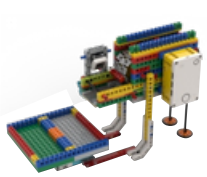
Prediction: Move forward

PROJECTS

LEGO Forklift

LEGO Dog

FollowBot



Conveyor Sorting System

GyroClaw

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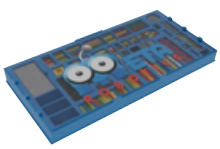
Modeled after First Lego League (FLL) and World Robot Olympiad (WRO), the obstacle challenge course aims to prepare the students with situational and task-based coding. Students will hone their problem-solving skills and robotics skillset, which is one of the most sought-after skillsets in the 4th generation of the industrial revolution where digital evolution is taking place right now.

OBSTACLE CHALLENGE COURSE

EDUCATION TOOLS

LEGO Spike Prime



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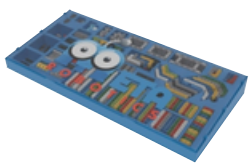

LEGO Technic Tray 2

Tablet

PROGRAMME DESCRIPTION

For every lesson, the students will be tasked to build a robot to clear a specific obstacle setup by the trainers and progress to completing the entire mission. Students are also required to make purposeful modifications with the engineering principles that they have acquired in the Robotics and Software Engineering program to ensure that the objectives are achieved.

MISSION AND CHALLENGES

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Introduces students aged 12 and above to the foundational elements of robotics using the GearsBot platform. Students will engage in hands-on activities that involve simulating and programming GearsBot prototypes, gaining an understanding of basic robotics concepts including sensors, actuators, and programming logic. Students will understand the basic principles of sensors and how they are used in robotics, specifically in the context of GearsBot.

VIRTUAL OBSTACLE CHALLENGE

EDUCATION TOOLS

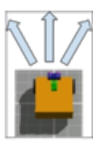
Tablet

Projection Screen

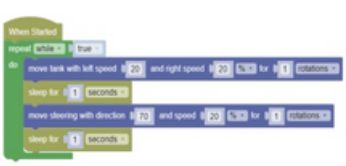
https://gears.aposteriori.com.sg

Learning Website

CODING

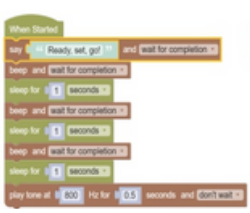


PROGRESSIVE TASKS



Task 1: Program GearsBot to move in a square pattern.

Task 2: Enhance the program to include a sensor simulation, making GearsBot stop if an obstacle is detected.



Task 3: Utilize the sound function to enhance the bot..

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