

# Avishkaar Innovator Curriculum



# Foreword

At Avishkaar, we believe the future belongs to innovators. Our Innovator Curriculum introduces children to AI, Robotics, IoT, Coding, and more, helping them develop the skills to innovate. Through hands-on, fun activities, students explore creativity, problem-solving, and critical thinking. Our program prepares learners to thrive in a rapidly changing world, fostering adaptability, collaboration, and resilience.

With an emphasis on experiential learning, our program equips students with the skills necessary for success in an ever-evolving society. Broadly following the principles laid out by NEP 2020 and National Curriculum Framework 2020. Curated by alumni from :



The Business School  
for the World®



**BITS PILANI**



# Pedagogy

Avishkaar Curriculum recommends 32 sessions in a year which includes:



**22-25 Hands-on Projects:**  
Igniting innovation using design thinking.



**4-5 Worksheets:**  
Reinforcing concepts and introducing formative assessments.



**3 Challenge Days:**  
Promoting empathy, inclusivity, and positive interactions.



**Demo Day:**  
Showcasing student achievements and fostering feedback.

Laying the foundation of an innovator with skills like :



**Leadership**



**Collaboration**



**Creativity**



**Communication**



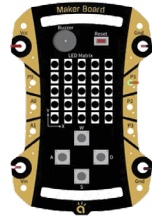
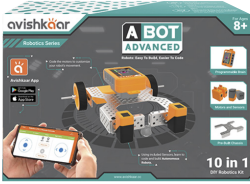





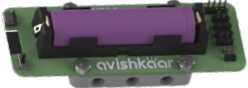


**Resilience**

# Curriculum Learning Outcomes at a glance

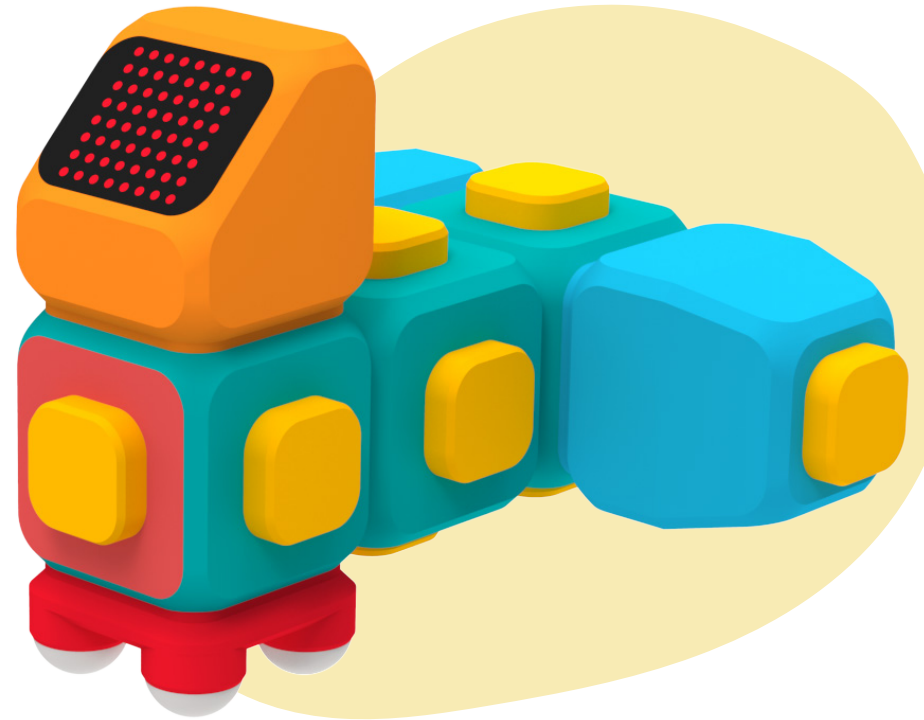
DOMAIN	SKILLS	PRIMARY (GRADES : 1-2)	JUNIOR (GRADES : 3-5)	MIDDLE (GRADES : 6-8)	SENIOR (GRADES : 9-12)
Robotics	Mechanical Design Mathematical Logic Sensors	<ul style="list-style-type: none"> <li>- Understands basic robot movements</li> <li>- Understands basic logic controls</li> <li>- Understands robotic system</li> </ul>	<ul style="list-style-type: none"> <li>- Builds simple machines</li> <li>- Understands logic to control robots</li> <li>- Understands sensor response to the world</li> </ul>	<ul style="list-style-type: none"> <li>- Design complex machines</li> <li>- Apply advanced logic</li> <li>- Integrate multiple sensors</li> </ul>	<ul style="list-style-type: none"> <li>- Apply robotics to real-world scenarios like automation</li> <li>- Design communicating robots</li> </ul>
Internet of Things (IoT)	Circuit Design Sensors Embedded Systems			<ul style="list-style-type: none"> <li>- Build simple circuits</li> <li>- Use sensors to create devices</li> <li>- Program embedded systems</li> </ul>	<ul style="list-style-type: none"> <li>- Design advanced IoT solutions</li> <li>- Understand bluetooth communication</li> <li>- Sensors and embedded systems</li> </ul>
Artificial Intelligence (AI)	AI Foundations Data Handling Machine Learning			<ul style="list-style-type: none"> <li>- Learn AI basics and data handling</li> <li>- Create basic AI models</li> <li>- Understand Supervised Learning</li> </ul>	<ul style="list-style-type: none"> <li>- Build AI models with Python</li> <li>- Develop ML algorithms</li> <li>- Understand AI ethics</li> </ul>
Computational Thinking	Problem-Solving Algorithm Design	<ul style="list-style-type: none"> <li>- able to break down simple problems</li> <li>- Understands input/output</li> <li>- Understands Sequencing</li> </ul>	<ul style="list-style-type: none"> <li>- able to break down problems</li> <li>- can create basic algorithms</li> <li>- Understands block-based coding</li> </ul>	<ul style="list-style-type: none"> <li>- Design structured algorithms</li> <li>- Can translate block code to text code</li> <li>- learn principles of quality</li> </ul>	<ul style="list-style-type: none"> <li>- Understand data structures</li> <li>- Understand system design</li> <li>- Apply complex programming concepts</li> <li>- Focus on testing and debugging</li> </ul>
Design Thinking	Innovation Prototyping	<ul style="list-style-type: none"> <li>- Understands innovation</li> <li>- Becomes familiar design cycle</li> </ul>	<ul style="list-style-type: none"> <li>- Apply design thinking</li> <li>- Create prototypes</li> <li>- Collaborate</li> </ul>	<ul style="list-style-type: none"> <li>- Complete design thinking cycle</li> <li>- Test with real users</li> </ul>	<ul style="list-style-type: none"> <li>- Lead design projects</li> <li>- Prototype and test with users</li> </ul>

# Products





	ROBOTICS	IoT	AI
AMS	<p>The cutting-edge AMS software</p> 		
PRIMARY (GRADES -1-2)	 <p>Tweak</p>		 <p>Maker Board</p>
JUNIOR (GRADES -3-4)	 <p>A-Bot Advanced Kit</p>	 <p>MEX Robotics Advanced Kit</p>	
MIDDLE (GRADES -5-6)		 <p>IoT Starter Kit</p>	 <p>Lite Brain &amp; Full Brain</p>
SENIOR (GRADES -7-9)	 <p>Robotics Pro Kit</p>	 <p>Classroom Bundle</p>	 <p>MEX Core +</p>

# Primary Level





Grades 1 – 2 | For Ages 6–7






# Grade 1 (Tweak)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>RoboBasics</p>	<p>1 Session 1 Hour</p>	<p>Basics of Robotics &amp; Computers</p>	<p>Computers, Robots and their uses</p>
 <p>Code Commanders</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Coding</li> <li>- Algorithms</li> <li>- Sequencing</li> </ul>	<p>Human Robots Game Sequencing of Sandwich Making</p>
 <p>RoboSystems</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Understanding Robot as a System</li> <li>- Identifying Robot Parts</li> <li>- I/O System</li> <li>- I/O LEDs</li> </ul>	<p>Tweak Modules Introduction Hello Bot Color Play</p>
 <p>Mech Masters</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Building a Robot Design</li> <li>- Center of Gravity</li> <li>- Momentum</li> <li>- Friction</li> </ul>	<p>RC Car Duck Race Exploring No Castor Wheel RC Car</p>





# Grade 1 (Tweak)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Direction Wizards</p>	<p>3 Sessions 3 Hour</p>	<ul style="list-style-type: none"><li>- Direction Sense</li><li>- Motor Movement</li><li>- Rotations</li><li>- Forward/Backward</li><li>- Delay</li></ul>	<p>Tweak Meet Friends Game Parking Garage Ballerina</p>
 <p>Problem Solvers</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"><li>- Obstacle Course Activity</li><li>- Car Game</li></ul>	<p>Car Game Making Choices Via Games</p>
 <p>Loop Wizards</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"><li>- Understanding Loops</li><li>- Programming Loops</li><li>- Decision Making</li></ul>	<p>Loop-A-Dance Tweak meets friends - Ice Cream Man</p>
 <p>Mech Masters</p>	<p>1 Session 1 Hour</p>	<ul style="list-style-type: none"><li>- Understanding Sense Organs</li><li>- IR Sensors</li><li>- Triggers</li></ul>	<p>Observing Tweak Sensors Hand Follower Pet Tweak</p>




# Grade 1 (Tweak)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 Innovators Hub	1 Session 1 Hour	<ul style="list-style-type: none"><li>- Design Thinking</li><li>- Innovation</li></ul>	Making Cohorts Design Thinking Projects
 Safety Squad	1 Session 1 Hour	Privacy and online safety discussion	Privacy and online safety project
 Presenting Your Invention	5 Sessions 5 Hours	Leadership Collaboration Creativity Communication Resilience	Demo Day











# Grade 2 (Tweak)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>RoboMotion</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Discussion : Robots &amp; Computers</li> <li>- Tweak as a Robot System</li> <li>- Understanding Action Motor</li> <li>- Bot Making</li> </ul>	<p>Identifying Tweak Parts and their uses Traffic Cop Bot Tweak Benchy - Race Fun Action Motor Models</p>
 <p>Code Commanders</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Programming Constructs</li> <li>- Revisiting Loops &amp; Conditions</li> <li>- Story Telling</li> <li>- Craft Activity</li> </ul>	<p>Quiz on Loops, Conditions, Delay Kathakali Tweak Decorate Traffic Cop Bot Tweak Meets Friends - Painter</p>
 <p>Sensor Savvy</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Understanding Touch Sensors</li> <li>- Understanding LDR Sensors</li> <li>- Understanding Color Sensors</li> <li>- Revisiting IR Sensors</li> </ul>	<p>Merry Go Round Sunflower Tweak Glow bug Firefly Rodeo Bull Chameleon Object Avoider</p>
 <p>Problem Solvers</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Problem Solving</li> <li>- Story Telling</li> <li>- Algorithm</li> <li>- Group Activity</li> <li>- Craft Activity</li> </ul>	<p>Lion Grass Goat Problem Cat and Mouse Chase Game Traffic Cop Bot Cars Bot Traffic Light Observing</p>











# Grade 2 (Tweak)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 Design Thinkers	1 Session 1 Hour	<ul style="list-style-type: none"><li>- Design Thinking</li><li>- Innovation</li><li>- Empathise, Ideate, Design, Prototype, Testing, Presentation</li></ul>	Making Cohorts Picking Problem Statements Making Projects
 Data Guru	1 Session 1 Hour	<ul style="list-style-type: none"><li>- Class Discussion</li></ul>	Understanding Data
 Presenting Your Invention	5 Sessions 5 Hours	Leadership Collaboration Creativity Communication Resilience	Demo Day




# Grade 3 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>RoboMotion</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Basics of Robotics</li> <li>- Motion System</li> <li>- Remote Controls</li> </ul>	<p>RC Car Automate Motions </p>
 <p>Code Commanders</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Programming Constructs</li> <li>- Motor Interfacing</li> <li>- Concept of Time and Delay</li> <li>- Rotations and Turns</li> </ul>	<p>Turning Robot Rotation Bot - 45 degrees Rotation Bot - 90 degrees</p>
 <p>Challenge Day - Robot Racer</p> 			
 <p>Robot Adventure</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Centre of Mass and Balancing</li> <li>- Motion Transmission</li> <li>- Pulley Mechanism</li> <li>- Finite Loops</li> </ul>	<p>Artist Bot Simple Rope Car</p>
 <p>Math Machines</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Mathematical Operators</li> <li>- Counters and Indicators</li> <li>- Random Number Generator</li> <li>- Conditional Statements</li> </ul>	<p>Equation Solver Divisible or not? Simple Division  Multiple of 3 Odd Even Identifier</p>
 <p>Challenge Day - DeliveryDroids</p> 			




# Grade 3 (ER-Series)

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 <p>Code Commanders</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Programming Constructs</li> <li>- Motor Interfacing</li> <li>- Concept of Time and Delay</li> <li>- Rotations and Turns</li> </ul>	<p>Turning Robot Rotation Bot - 45 degrees Rotation Bot - 90 degrees</p>
 Challenge Day - Robot Racer			
 <p>Robot Adventure</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Centre of Mass and Balancing</li> <li>- Motion Transmission</li> <li>- Pulley Mechanism</li> <li>- Finite Loops</li> </ul>	<p>Artist Bot Simple Rope Car</p>
 <p>Math Machines</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Mathematical Operators</li> <li>- Counters and Indicators</li> <li>- Random Number Generator</li> <li>- Conditional Statements</li> </ul>	<p>Equation Solver Divisible or not? Simple Division   Multiple of 3 Odd Even Identifier</p>
 Challenge Day - DeliveryDroids			




# Grade 3 (MEX)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Car with Castor</p>	<p>5 Sessions 5 Hours</p>	<ul style="list-style-type: none"> <li>-Forward backward Using App</li> <li>-Car with Castor in Linear motion</li> <li>-Car with Castor in Lateral motion</li> <li>-Car with Castor Moving in Triangle</li> <li>-Car with Castor Moving in Rectangle</li> </ul>	<ul style="list-style-type: none"> <li>- Master forward/backward movement via the app.</li> <li>- Implement forward/backward movement using code.</li> <li>- Implement turns using code.</li> <li>- Explore various movement patterns.</li> <li>- Experiment with motion control algorithms.</li> </ul>
 <p>Body Builder</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Up and down by app</li> <li>- Body Builder with Blinking LED</li> <li>- Body Builder with Motor - Controlled Arm</li> <li>- Body Builder with LED Arm bot</li> </ul>	<ul style="list-style-type: none"> <li>- Control up/down movement using the app.</li> <li>- Control LED blinking and timing.</li> <li>- Practice motor interfacing and control.</li> <li>- Combine LED and motor actions for parallel processing.</li> </ul>
 <p>Piano</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Play Piano on Hand Detection</li> <li>- Rhythm player</li> </ul>	<ul style="list-style-type: none"> <li>- Play music based on hand detection</li> <li>- Play melody tunes with IR sensor.</li> </ul>












# Grade 3 (MEX)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Pull Up Bot</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Simple Pull Up/Down with app</li> <li>- Pull up bot with vertical motion</li> <li>- Counting Pull-Ups</li> <li>- Interval Training Timer</li> </ul>	<ul style="list-style-type: none"> <li>- Control up/down movement via the app.</li> <li>- Implement pull-up movements using loops.</li> <li>- Count pull-up repetitions using variables.</li> <li>- Create an interval training timer with time-based programming.</li> </ul>
 <p>Line Follower</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Line Following</li> <li>- Obstacle Avoidance</li> <li>- Edge Avoider</li> <li>- Maze Solving</li> </ul>	<ul style="list-style-type: none"> <li>- Master sensor-based line following.</li> <li>- Apply IR sensor, conditional statements, and variables.</li> <li>- Apply IR sensor and variables for edge detection.</li> <li>- Develop maze-solving strategies using algorithms.</li> </ul>
 <p>Humanoid</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Walking Humanoid</li> <li>- Get on the dance floor with Humanoid</li> </ul>	<ul style="list-style-type: none"> <li>- Control humanoid movement via the app.</li> <li>- Create movement sequences for dancing.</li> </ul>

# Grade 3 (MEX)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Forklift</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Forklift Moving along the Y-axis</li> <li>- Up on Even/Down on Odd</li> <li>- Up on forward/Down on backward</li> </ul>	<ul style="list-style-type: none"> <li>- Implement up/down movement with code.</li> <li>- Perform actions based on even/odd values with logic.</li> <li>- Control actions based on direction with conditionals.</li> </ul>
 <p>Car with Steering</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Car with Steering Movement and Turns</li> <li>- Car with Steering Traffic Light Simulator</li> <li>- Car with Steering Alarm</li> </ul>	<ul style="list-style-type: none"> <li>- Practice turns and rotational motion.</li> <li>- Simulate a traffic light system with event-driven programming.</li> <li>- Use LED and alarm during movement with parallel processing.</li> </ul>
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership Collaboration Creativity Communication Resilience</p>	<p>Demo Day</p>





# Grade 4 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Mechitect</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Mechanical Designing</li> <li>- Centre of Gravity</li> <li>- Frictionless motion</li> <li>- Energy Conservation</li> </ul>	<p>Four Wheel Base Sketching your Dream Robot  Pull Toy Three Wheel Base Simple Crane</p>
 <p>Soccer Series</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Momentum and Energy</li> <li>- Friction</li> <li>- Control Coordination</li> <li>- Angular Motion</li> </ul>	<p>Soccer Bot with One Arm Soccer Bot with Two Arms Simple Machines </p> 
 Challenge Day - Soccer Match			
 <p>SensiTouch</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Touch Sensors Interfacing</li> <li>- Applications of Touch Sensor</li> <li>- Time based Motion</li> </ul>	<p>Motion with Touch Snake Motion Bot Enclosed Car Table Fan</p>
 <p>IRsense</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- IR Sensor Interfacing and Application</li> </ul>	<p>Toy Car Parking Station Robotics in real life?  Line Follower II Hand Follower II</p> 
 Challenge Day - Snake Hurdle Race			



# Grade 4 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Mathobotics</p>	<p>4 Sessions 4 Hours</p> <p> - 4  - 0</p>	<p>- Mathematics and Physics Application</p>	<p>Pulley Crane Pulley Crane with Number types Rotating Crane with Counter Bot Rotating Crane</p>
 <p>Sensor Arithmetics</p>	<p>3 Sessions 3 Hours</p> <p> - 3  - 1</p>	<p>- Mathematics and Physics Application</p>	<p>Mission to Moon Circles Height Measurement Measurement and Distance </p>
 Challenge Day - Collect the Balls 			
 <p>Puzzle Masters</p>	<p>2 Sessions 2 Hours</p> <p> - 2  - 1</p>	<p>- Logical Reasoning and Coding</p>	<p>Escape Puzzle Puzzle Run </p>
 <p>ReconLogic</p>	<p>2 Sessions 2 Hours</p>	<p>- Pattern Recognition and Decomposition</p>	<p>Basic Ball Shooter Touch Dancer</p>

# Grade 4 (MEX)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 MEX Rover	4 Sessions 4 Hours	<ul style="list-style-type: none"> <li>- Control by app</li> <li>- Motion wth Code</li> <li>- Touch Based Rover</li> <li>- Obstacle Avoider using Coding</li> </ul>	<ul style="list-style-type: none"> <li>- Control forward/backward movement via the app.</li> <li>- Implement movement using touch sensor and learn functions.</li> <li>- Use touch sensor for movement control.</li> <li>- Implement obstacle avoidance using IR sensor.</li> </ul>
 MEX Bike	2 Sessions 2 Hours	<ul style="list-style-type: none"> <li>- Forward backward Using App</li> <li>- Blinking LED Light</li> </ul>	<ul style="list-style-type: none"> <li>- Master movement via app controls.</li> <li>- Control LED lights and learn about digital output/timing.</li> </ul>
 Humanoid	2 Sessions 2 Hours	<ul style="list-style-type: none"> <li>- Walking Humanoid</li> <li>- Forward/backward Code</li> <li>- Hand Follower Humanoid</li> <li>- Hand/Object Avoider Humanoid</li> </ul>	<ul style="list-style-type: none"> <li>- Control movement via app and understand motor functions.</li> <li>- Learn motor block use in AMS and coding concepts.</li> <li>- Explore IR sensor and coding concepts.</li> <li>- Understand conditions using IF-Else block.</li> </ul>
 Mex construction Lift	4 Sessions 4 Hours	<ul style="list-style-type: none"> <li>- Up and down by app</li> <li>- Up and down by code</li> <li>- Touch Based Construction Lift</li> <li>- IR Sensor Based Construction Life</li> </ul>	<ul style="list-style-type: none"> <li>- Control lift movement via app and grasp remote control basics.</li> <li>- Implement lift movement using code.</li> <li>- Control lift movement with touch sensor.</li> <li>- Use IR sensor for lift control with coding.</li> </ul>

# Grade 4 (MEX)











UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>MEX Trolley</p>	4 Sessions 4 Hours	<ul style="list-style-type: none"><li>- Forward/Barward by app</li><li>- Touch Based Mex Trolley</li><li>- IR Sensor Based Mex Trolley</li><li>- Advance Trolley Bot</li></ul>	<ul style="list-style-type: none"><li>- Control trolley movement via the app.</li><li>- Use touch sensor for movement control.</li><li>- Control trolley using IR sensor.</li><li>- Integrate IR, touch, LED, and buzzer sensors in a complex bot.</li></ul>
 <p>Presenting Your Invention</p>	5 Sessions 5 Hours	Leadership Collaboration Creativity Communication Resilience	Demo Day

# Intermediate Level










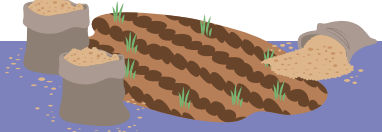







Grades 5 - 6 | For Ages 11-13




# Grade 5 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>CodeCrafts</p>	<p>3 Sessions 3 Hours</p>	<p>- Introduction to programming</p>	<p>Understanding Kit &amp; Parts Understanding Full Brain 2.0 Smart Robots  Display Name Blink Name</p>
 <p>Maths Machine</p>	<p>3 Sessions 3 Hours</p>	<p>- Simple Machine with Mathematical operations</p>	<p>Robotic Grippers Addition Equation Solver &lt; Conditional Bot</p> 
 Challenge Day - Seed link			
 <p>SensorsRevive</p>	<p>5 Sessions 5 Hours</p>	<p>-Revisit Sensor and Application</p>	<p>Understand basic function of IR, Touch &amp; Color Sensors with Demo Bumper Car Reverse Bumper Car Automatic Door Opener Line Follower I</p>
 <p>GearCrafts</p>	<p>2 Sessions 2 Hours</p>	<p>- Physics Concepts</p>	<p>Robo Drag Robo Drag Without Gears Gears and Mechanisms </p> 
 Challenge Day - GuardianGrove			




# Grade 5 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 ColorBotix	3 Sessions 3 Hours  - 3  - 1	- Color Sensor and Application	Color based motion Color Separator Color Sensor  Color based Line Follower
 SortingBots	3 Sessions 3 Hours  - 3  - 1	- Mathematics and Physics Application	Sorting in ascending Order Sorting in Descending Order Fibonacci series Series and Sortings 
 Challenge Day - SowBots 			
 Sonicbots	3 Sessions 3 Hours  - 3  - 1	- Ultrasonic Sensor and Application	Object avoider on Count Grass Cutter Object Repeller Ultrasonic Sensor 
 MindSolver	2 Sessions 2 Hours  - 1  - 0	- Problem Solving	Touchless Construction site lift Tractor Robot









# Grade 5 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership Collaboration Creativity Communication Resilience</p>	<p>Demo Day</p>


# Grade 6 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Referesh Module</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Mathematical application</li> <li>- Application of Touch Sensor</li> <li>- Application of IR Sensor</li> </ul>	<p>Himalayan Range Automated Boom Barrier Automated Flag hoist</p>
 <p>Robotics Kinematics</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Complex Machine structures and Physics Behind</li> </ul>	<p>Catapult Robot Rack and Pinion Mechanism Multi-Directional Drill Complex Machine </p> 
 Challenge Day - QuakeQuest:			
 <p>Game Assistants</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Artistic Robots</li> <li>- Gaming Bots</li> </ul>	<p>Circle Drawing Robot Automated Rangoli Maker Shapes and Patterns </p> <p>Ball Shooter Robot <b>Ball Shooter Game</b> </p>
 <p>Mastering Mechanisms</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Complex Machines</li> </ul>	<p>Package Carrier Robot Shredding Machine Robo Drag</p> 
 Challenge Day - FireForce			






# Grade 6 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Biomimetic Robots</p>	<p>2 Sessions 2 Hours</p>	<p>- Animal like robots</p>	<p>Walker Robot Turtle Robot</p>
 <p>Autonomous Steering Solution</p>	<p>5 Sessions 5 Hours</p>	<p>- Mathematical Equations - Steering Mechanism</p>	<p>Control with Condition The remainder Problem Problem statements  Steering with Gears Three wheel steering mechanism Robo Trike Steering Mechanism </p>
 Challenge Day - RoboRescue 			
 <p>UltraBots</p>	<p>2 Sessions 2 Hours</p>	<p>- Ultrasonic Sensor and Application</p>	<p>Ultrasonic Object Follower Page Turner Robot</p>
 <p>RoboSapien</p>	<p>2 Sessions 2 Hours</p>	<p>- Humanoid</p>	<p>Humanoid Robot Automate the Humanoid Robot</p>






# Grade 6 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership Collaboration Creativity Communication Resilience</p>	<p>Demo Day</p>


# Grade 6 (ISK)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Simulation</p>	<p>7 Sessions 7 Hours</p>	<ul style="list-style-type: none"> <li>- Maker Board Onboard Features</li> </ul>	<p>Display board Name initial letter Logo Badge Flag book Dual mode (pressed and long pressed) Events  Number Dice TV Channels</p> 
<p>Challenge Day - Energy Sources</p>			
 <p>Programming Constructs</p>	<p>7 Sessions 7 Hours</p>	<ul style="list-style-type: none"> <li>- Variables</li> <li>- Random Number Generator</li> <li>- Infinite loop vs finite loop</li> <li>- Independent Exploration</li> <li>- Counters</li> </ul>	<p>Variables (of different data types) Random Mood Smiley Frown Animation Firefly effect Flashing logo for a student Count up to 10 Countdown timer</p> 
<p>Challenge Day - Electricity Meter</p>			

# Grade 6 (ISK)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 Sounds	2 Sessions 2 Hours	<ul style="list-style-type: none"> <li>- Onboard Buzzer (on device)</li> </ul>	Playing sounds at different frequencies Playing Happy Birthday Tune
 Sprites and Matrices	4 Sessions 4 Hours	<ul style="list-style-type: none"> <li>- Understanding Sprites (on device)</li> <li>- Moving Sprites (on device)</li> <li>- Moving Sprites with delay (on device)</li> <li>- Deleting Sprites (on device)</li> </ul>	Building a Zoo Sprite Movement on Button Click Automatic Sprite Movement Disappearing Sprites
Challenge Day - Sprites and Energy			
 Mathematical Logic	2 Sessions 2 Hours	<ul style="list-style-type: none"> <li>- Math Operations (on device)</li> </ul>	Adding two numbers Subtraction
 Bluetooth Operations	3 Sessions 3 Hours	<ul style="list-style-type: none"> <li>- Matrices Random numbers</li> <li>- Voice Controlled</li> <li>- Game Design</li> </ul>	Graphical Dice Predict country Wireless Snake Game

# Grade 6 (ISK)










UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership Collaboration Creativity Communication Resilience</p>	<p>Demo Day</p>

# Advanced Level








Grades 7 – 8




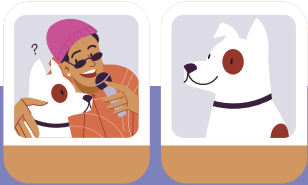




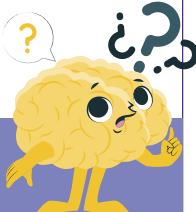
# Grade 7 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Livebotics</p>	<p>6 Sessions 6 Hours</p>	<p>- Real time application Robots</p>	<p>Addition Calculator Traffic Light Observer Interactive Smart Dustbin Construction Interactive Smart Dustbin Coding and Waste collection activity Stamping Machine Construction Stamping Machine code and Play Physics Concepts </p> 
<p> Challenge Day - Garbage collection</p>			
 <p>Autobotix</p>	<p>7 Sessions 7 Hours</p>	<p>- Industrial application based robots</p>	<p>Penalty Ball Shooter Long range Catapult Smart Dumper Robot Construction Smart Dumper Robot Code Arena Run with Dumper Robot  Mechanical Press Scissor lift/ Cherry Picker Lifting Machines </p> 
<p> Challenge Day - Segregation of waste</p>			



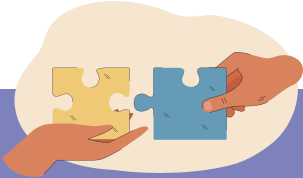


# Grade 7 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 Foodmatic	3 Sessions 3 Hours	- Food Industry Application	Smart Vending Machine Construction Smart Vending Machine Code and Play Butler Robot
 SportBots	4 Sessions 4 Hours	- Sports Industry Application	Archery Robot All Terrain Robot Construction All Terrain Robot Coding All Terrain Robot Race 
<div style="display: flex; align-items: center; justify-content: center;">  <span style="margin: 0 10px;">Challenge Day - Recycling and Reuse</span>  </div>			
 SpectrumSense	2 Sessions 2 Hours	- Application of Color Sensor	Color Line follower II Line Follower I
 WareBot	2 Sessions 2 Hours	- Industrial Application of Robots	Automated Warehouse Management System Construction Automated Warehouse Management System Code


# Grade 7 (ISK)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Programming Constructs</p>	<p>7 Sessions 7 Hours</p>	<p>- Recap (running program on device)</p>	<p>Name initial letter Firefly Animation Beating Heart Animation TV Channels Dice Basic Calculator Traffic Lights</p> 
<p>Challenge Day - Virtual Pet</p>			
 <p>Mathematical Logic</p>	<p>3 Sessions 3 Hours</p>	<p>- Math Operations</p>	<p>Perfect square Finding area of a rectangle Sorting the list</p>
 <p>Game Design</p>	<p>4 Sessions 4 Hours</p>	<p>- Basics of Game Design</p>	<p>Number Game Game design  Snake Game Car Game Conditional statements  Space Invader Game</p> 
<p>Challenge Day - Educational Quiz</p>			










# Grade 7 (ISK)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Sprites and Matrices</p>	<p>3 Sessions 3 Hours</p>	<p>- Sprite Manipulation</p>	<p>Drawing Triangle Drawing Square Sprites and Geometry Moving Sprites automatically</p>
 <p>Mathematical Logic</p>	<p>3 Sessions 3 Hours</p>	<p>- Conditionals</p>	<p>Even odd detector Factorial Fibonacci Series</p>
<p>Challenge Day - Logic Puzzle</p>			
 <p>Programming Constructs</p>	<p>4 Sessions 4 Hours</p>	<p>- Functions</p>	<p>Functions Function returning a value Functions Calculator with functions Calculate area of Circle</p>
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership Collaboration Creativity Communication Resilience</p>	<p>Demo Day</p>

# Grade 7 (ISK)






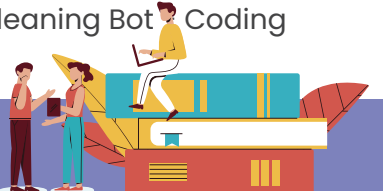



UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership Collaboration Creativity Communication Resilience</p>	<p>Demo Day</p>

# Grade 8 (ER-Series)










UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Basics of Networking</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Understanding Basics of Communication</li> <li>- One side Communication</li> <li>- Two side Communication</li> </ul>	<p>Understanding Communication with a Demo Basics of Communication  Say Hello! Sending Invites</p>
 <p>Communicating Motors</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Motor Control from Client</li> </ul>	<p>Controlling Motors Self Driving Car Bluetooth  Even/Odd Identifier</p>
 Challenge Day - Parents - School Communication			
 <p>CalcuBots</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Mathematical Operators</li> <li>- Speed</li> </ul>	<p>Prime number Check Push Robot Speedy bot</p>
 <p>Signal Scouts</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Sensor Based Communication</li> <li>- Wireless controlling</li> </ul>	<p>Self driving robot Self driving robot Calculative Sliders Wireless Remote Wireless Communication </p>
 Challenge Day - Navigating Routes			










# Grade 8 (ER-Series)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Talking Bots</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Sensor based Communication</li> <li>- Both ways Communication</li> </ul>	<p>Smart Pick and Drop Robot Decision making robot Talking Robots</p>
 <p>Helping Bots</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Sensor based Communication</li> <li>- Problem Solving</li> </ul>	<p>Rescue Robots Robots Applications  Smasher Platform Cleaning Bot - Understanding Problem Statement and Bot construction Platform Cleaning Bot Coding </p>
 Challenge Day - Developing School Communities 			
 <p>Agrobots</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Problem Solving</li> </ul>	<p>Automated Agricultural Robots - Problem statement Understanding and Robot construction Automated Agricultural Robots - Coding Design the Arena Arena Run </p>
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership Collaboration Creativity Communication Resilience</p>	<p>Demo Day</p>





# Grade 8 (ISK)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Circuit Design</p>	<p>5 Sessions 5 Hours</p>	<ul style="list-style-type: none"> <li>- Basic circuits</li> <li>- Series and Parallel circuits</li> <li>- Concept of PWM</li> <li>- Basic circuits</li> </ul>	<p>Blinking of LED Circuits </p> <p>Knight Rider (4 LEDs)</p> <p>Fading effect</p> <p>PWM concept </p> <p>Blinking of 2 LEDs</p> <p>Fading of 2 LEDs</p>
<p>Challenge Day - Diwali lights with different patterns </p>			
 <p>Circuit Design</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Servo Motors</li> </ul>	<p>Controlling servo motors</p> <p>Servo motor </p> <p>PAN mechanism (using MKB buttons)</p>
 <p>Game/App Design</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Basics of Game Design</li> </ul>	<p>Cyclone Game</p> <p>Dodge the Virus Game</p> <p>Ludo Game</p>
 <p>Sound control</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Sound control</li> </ul>	<p>Piano</p>
<p>Challenge Day - Sunflower </p>			





# Grade 8 (ISK)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Smart Circuits</p>	<p>7 Sessions 7 Hours</p>	<ul style="list-style-type: none"> <li>- Sensors</li> <li>- MQ Sensors</li> <li>- IR Sensors</li> <li>- LDR</li> </ul>	<p>Rain alarm            Water sensor             Smart windows with servo motor            Pollution Badge            Water sensor             Pollution meter            Contactless Door Opener            Boom Barrier            Smart roof            LDR </p> 
<p>Challenge Day - Healthy/Unhealthy Food</p>			
 <p>Smart Circuits</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- MQ Sensors</li> <li>- LDR</li> <li>- Servo movements</li> </ul>	<p>Automatic Night Light            Light Alarm            Pollution Alarm            Reading Glass wiper</p>
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership            Collaboration            Creativity            Communication            Resilience</p>	<p>Demo Day</p>

# Grade 8 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Understanding Basics</p>	<p>6 Sessions 6 Hours</p>	<ul style="list-style-type: none"> <li>- Discussion on AI concepts</li> <li>- Artificial Intelligence in everyday things around us</li> <li>- Experiments on AI</li> <li>- What is Decision Making?</li> <li>- What is Pattern recognition?</li> <li>- Introduction to Computer vision</li> <li>- Understanding data (Images, sounds, pose)</li> <li>- Discussion on NLP</li> <li>- Introduction to AMS AI</li> <li>- Concepts of Machine learning (Supervised learning)</li> <li>- AI Ethics</li> </ul>	<p>Emoji Scavenger Hunt Rock Paper Scissor Game Google Teachable Machine ChatGPT, Alexa, Google Home</p> <ul style="list-style-type: none"> <li>- Understanding Data</li> <li>- Exploring Images and Posenet of AMS-AI (training and testing)</li> <li>- Understanding machine confidence</li> <li>- Ethics and Bias</li> </ul>
 Challenge Day			
 <p>Understanding Basics</p>	<p>7 Sessions 7 Hours</p>	<ul style="list-style-type: none"> <li>- Domains of AI</li> <li>- Introduction to AMS AI</li> <li>- Concepts of Machine learning (Supervised learning)</li> <li>- Understanding Data Model</li> <li>- Data Training</li> <li>- Virtual Storytelling and Data Acquisition</li> <li>- Understanding of facemesh Data</li> <li>- Introduction to AMS AI</li> <li>- Concepts of Machine learning (Supervised learning)</li> <li>- AI Decision Trees</li> <li>- Introduction to Hand Pose</li> </ul>	<p>AI Domains - CV, ML, NLP Emotion Detector Shape Recognition Game Virtual Puppeteer Face mask detector Understanding Data Exploring Handpose and Facemesh of AMS-AI (training and testing) Controlling Maker Board Simulator Recreate Rock Paper Scissors Game on AMS</p>
 Challenge Day			

# Grade 8 (AI)







UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Understanding Basics</p>	<p>6 Sessions 6 Hours</p>	<ul style="list-style-type: none"> <li>- Understanding of poseNet Data</li> <li>- Understanding of image Data</li> <li>- Understanding of handpose Data</li> <li>- Understanding of image Data</li> <li>- Introduction to Speech Recognition</li> <li>- Application of Speech Recognition</li> </ul>	<p>Fitness Tracker Snake Game AI-based Music Player Sign Language Translator Animal Classifier Piano with Speech Recognition Fist palm with Speech Recognition</p>
 Challenge Day			
 <p>Introduction to Python</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- Python Basics and IDE</li> <li>- Range Function</li> <li>- Python Scripts Mode</li> <li>- Output and Data types</li> </ul>	<p>Interpreter Mode of Python Use of range Function, print 0 to 19 Print counting to 20 Printing data types</p>
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership Collaboration Creativity Communication Resilience</p>	<p>Demo Day</p>

# Senior Level

Grades 9 – 12









# Grade 9 (ISK)







UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 Understanding Python basics	1 Sessions 1 Hours	- Discussion on Python syntax and structure	Hello World
 Introduction to Animation	1 Sessions 1 Hours	- Basic animation concepts in Python	Hello World Followed by Animation
 Exploring animation	1 Sessions 1 Hours	- Creating simple animations using loops	Blink Name
 Working with variables	1 Sessions 1 Hours	- Printing and manipulating variables	Printing Variables
 Arithmetic operations	1 Sessions 1 Hours	- Performing addition using Python	Addition Calculator
 Conditional logic	1 Sessions 1 Hours	- Detecting even or odd numbers using conditional statements	Even odd detector









# Grade 9 (ISK)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 Controlling LEDs	1 Sessions 1 Hours	<ul style="list-style-type: none"><li>- Creating simple LED patterns</li></ul>	Mood Lamp
 Using button inputs	1 Sessions 1 Hours	<ul style="list-style-type: none"><li>- Utilizing button inputs to perform calculations</li></ul>	Button Calculator
 Game logic and control flow	1 Sessions 1 Hours	<ul style="list-style-type: none"><li>- Developing a basic game with Python</li></ul>	Bingo Game
 Using loops	1 Sessions 1 Hours	<ul style="list-style-type: none"><li>- Using loops to check for palindromes</li></ul>	Palindrome Checker
 Loop manipulation	1 Sessions 1 Hours	<ul style="list-style-type: none"><li>- Applying skip counting using loop counters</li></ul>	Skip Counting By 3
 Edge detection in games	1 Sessions 1 Hours	<ul style="list-style-type: none"><li>- Implementing edge detection for sprite movement</li></ul>	Move Sprite on Edges



# Grade 9 (ISK)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Graphics and sprite movement</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Drawing and moving sprites diagonally in Python</li> </ul>	<p>Draw Sprites in Diagonal</p>
 Challenge Day			
 <p>Understanding mathematical algorithms</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Writing Python code to generate the Fibonacci sequence</li> </ul>	<p>Fibonacci</p>
 <p>Simulating random events</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Implementing a random dice roll in Python</li> </ul>	<p>Dice Roll Pattern</p>
 <p>Random number generation and pattern creation</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Creating an interactive pattern using random number generation</li> </ul>	<p>Feeling Lucky Pattern on Maker Board</p>
 <p>Mathematical operations</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Calculating factorials using loops</li> </ul>	<p>factorial</p>







# Grade 9 (ISK)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Prime number detection</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Writing code to identify prime numbers</li> </ul>	<p>prime number</p>
 <p>Mathematical formulas</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Converting temperatures between Celsius and Fahrenheit using Python</li> </ul>	<p>Temperature Conversion</p>
 <p>Combining sensors with LEDs</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Using temperature sensors to control LED colors</li> </ul>	<p>Temperature Mood Meter</p>
 <p>Challenge Day</p>			
 <p>Advanced game development</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Implementing collision detection and physics for sprite bouncing</li> </ul>	<p>Bouncing Sprites</p>
 <p>Sound programming</p>	<p>1 Sessions 1 Hours</p>	<ul style="list-style-type: none"> <li>- Generating and playing sounds using Python</li> </ul>	<p>Music Composer</p>






# Grade 9 (ISK)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 Game logic and collision detection	1 Sessions 1 Hours	- Creating a Snake game with collision detection	Snake game
 Time-based programming	1 Sessions 1 Hours	- Creating a countdown timer in Python	Countdown timer
 Presenting Your Invention	5 Sessions 5 Hours	Leadership Collaboration Creativity Communication Resilience	Demo Day






# Grade 9 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 Input/Output	2 Sessions 2 Hours	<ul style="list-style-type: none"> <li>- Math Functions</li> </ul>	Average of three subjects Calculate Simple Interest
 Functions	4 Sessions 4 Hours	<ul style="list-style-type: none"> <li>- Math with user input</li> <li>- Math Operations</li> </ul>	Area perimeter of rectangles Area of a circle Area of a triangle Cuboid Surface area and Volume
 Challenge Day			
 Functions	4 Sessions 4 Hours	<ul style="list-style-type: none"> <li>- Math Operations</li> <li>- Type Conversion</li> <li>- Loops</li> </ul>	Discounts Print numbers divisible by 3 between 1 and 100 String and number concatenations Printing a table of 5
 Understanding Basics	3 Sessions 3 Hours	<ul style="list-style-type: none"> <li>- Conditionals</li> <li>- Number Operations</li> <li>- Number Operations</li> </ul>	Fibonacci series Reversing a number Finding second highest in an array
 Challenge Day			






# Grade 9 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 Understanding Basics	4 Sessions 4 Hours	<ul style="list-style-type: none"> <li>- Functions</li> <li>- Tuples Creation Deletion</li> <li>- Tuples Operations</li> <li>- Numbers Operation</li> </ul>	Factorial Number and cube tuple from a list Searching in a tuple Calculator Check even odd Check negative number Find the Digits of a number
 Understanding Basics	3 Sessions 3 Hours	<ul style="list-style-type: none"> <li>- Numbers Operation</li> <li>- Numbers Operation</li> <li>- Numbers Operation</li> </ul>	Palindrome Checker Selection sorting Sum of nth term
 Challenge Day			
 Understanding AI Projects	2 Sessions 2 Hours	<ul style="list-style-type: none"> <li>- AI Project Life Cycle</li> <li>- Design Thinking</li> </ul>	Reverse Engineer Google teachable machine
 Presenting Your Invention	5 Sessions 5 Hours	Leadership Collaboration Creativity Communication Resilience	Demo Day





# Grade 10 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 Understanding Basics	1 Session 1 Hour	<ul style="list-style-type: none"> <li>- Number Operations</li> </ul>	program to handle simple runtime error
 Introduction to Python Libraries and packages	3 Sessions 3 Hours	<ul style="list-style-type: none"> <li>- Matplotlib</li> <li>- Data structure</li> </ul>	Introduction to Matplotlib Introduction to Numpy Basic line chart
 Basics of Matplotlib	2 Sessions 2 Hours	<ul style="list-style-type: none"> <li>- Matplotlib</li> <li>- Data Structure</li> </ul>	Line chart styles with Marker Scatter plot
 Challenge Day			
 Basics of Matplotlib	2 Sessions 2 Hours	<ul style="list-style-type: none"> <li>- Numpy</li> <li>- Data Structure</li> </ul>	Pie Chart Bar Chart






# Grade 10 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Basics of Matplotlib</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Numpy</li> <li>- Data Structure</li> </ul>	<p>Histogram</p>
 <p>Basics of openCV</p>	<p>4 Sessions 4 Hours</p>	<ul style="list-style-type: none"> <li>- OpenCV</li> <li>- Image Processing</li> </ul>	<p>Introduction to OpenCV Loading Image Image operations</p>
 <b>Challenge Day</b>			
 <p>Basics of openCV</p>	<p>1 Session 1 Hour</p>	<ul style="list-style-type: none"> <li>- OpenCV Image processing"</li> </ul>	<p>Capturing image with button Drawing on images</p>
 <p>Applications of openCV</p>	<p>1 Session 1 Hour</p>	<ul style="list-style-type: none"> <li>- Open CV Image Processing</li> </ul>	<p>Background subtraction Selfie booth</p>






# Grade 10 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Applications of openCV</p>	<p>1 Session 1 Hour</p>	<p>- OpenCV Image processing"</p>	<p>Painting with mouse on an image</p>
 <p>Applications of openCV</p>	<p>1 Session 1 Hour</p>	<p>- OpenCV Deep Learning</p>	<p>Detecting eyes in a video Face detection in a video Smile detection in video</p>
 <p>Application of AI</p>	<p>1 Session 1 Hour</p>	<p>- Teachable machine export code</p>	<p>Teachable machine export code</p>
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership Collaboration Creativity Communication Resilience</p>	<p>Demo Day</p>






# Grade 11 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Variables and Data Types</p>	<p>2 Sessions 2 Hours</p>	<p>- Explore different data types (int, float, string) how to use variables to store information."</p>	<p>Temperature converter Word Counter</p>
 <p>Control Flow (if statements, loops)</p>	<p>2 Sessions 2 Hours</p>	<p>- Introduce conditional statements (if, elif, else) loops (for, while) to control the flow of the program."</p>	<p>Number Guessing game pattern print</p>
 <p>Functions and Parameters</p>	<p>2 Sessions 2 Hours</p>	<p>- Define functions, understand parameters explore the concept of reusability in code.</p>	<p>Advance Calculator Find Maximum</p>
 Challenge Day			
 <p>Lists and Dictionaries</p>	<p>2 Sessions 2 Hours</p>	<p>- Learn about lists and dictionaries their application in storing and organizing data.</p>	<p>To-Do List Dictionary Translator</p>





# Grade 11 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>File Handling</p>	<p>2 Sessions 2 Hours</p>	<p>- Understand how to read from and write to files in Python</p>	<p>File Word Counter CSV Data Analysis</p>
 <p>Error Handling</p>	<p>1 Session 1 Hour</p>	<p>- Introduce the concept of handling errors gracefully in a program.</p>	<p>Safe Calculator</p>
 <p>Introduction to Libraries</p>	<p>2 Sessions 2 Hours</p>	<p>- Explore basic concepts of NumPy for numerical operations.</p>	<p>NumPy Intro NumPy Array Manipulation</p>
 Challenge Day			
 <p>Introduction to Libraries</p>	<p>2 Sessions 2 Hours</p>	<p>- Explore basic concepts of NumPy for numerical operations.</p>	<p>Roll Dice RPG character</p>






# Grade 11 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Advanced Data Structures</p>	<p>2 Sessions 2 Hours</p>	<p>- Explore more complex data structures like tuples and sets and understand their use cases.</p>	<p>Tuple Manipulation Set Operations</p>
 <p>List Comprehensions</p>	<p>1 Session 1 Hour</p>	<p>- Introduce list comprehensions as a concise way to create lists.</p>	<p>Squares and Cubes</p>
 <p>Introduction to Pandas for Data Manipulation</p>	<p>2 Sessions 2 Hours</p>	<p>- Learn the basics of Pandas for data manipulation and analysis.</p>	<p>Data Cleaning with Pandas Data Exploration</p>
 Challenge Day			
 <p>Introduction to Libraries</p>	<p>2 Sessions 2 Hours</p>	<p>- Explore basic concepts of NumPy for numerical operations.</p>	<p>Roll Dice RPG character</p>





# Grade 11 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Data Visualization (Matplotlib or Seaborn)</p>	<p>2 Sessions 2 Hours</p>	<p>- Explore visualization libraries and create compelling plots</p>	<p>Line Chart Pie Chart</p>
 <p>Introduction to Machine Learning</p>	<p>2 Sessions 2 Hours</p>	<p>- Understand the basic concepts of machine learning.</p>	<p>mnist dataset Predicting Student grade</p>
 <p>Supervised Learning Basics</p>	<p>2 Sessions 2 Hours</p>	<p>- Dive deeper into supervised learning concepts like labels, features, and training</p>	<p>House Price Prediction</p>
 <p>Presenting Your Invention</p>	<p>5 Sessions 5 Hours</p>	<p>Leadership Collaboration Creativity Communication Resilience</p>	<p>Demo Day</p>





# Grade 12 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Supervised Learning Basics</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Understanding the basics of supervised learning</li> </ul>	<p>House Price Prediction</p>
 <p>Introduction to Scikit-Learn</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Explore Scikit-Learn for implementing machine learning algorithms</li> </ul>	<p>Decision Tree Classifier K-Nearest Neighbors (KNN)</p>
 <p>Object-Oriented Programming (OOP) in Python</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Understand OOP concepts (encapsulation, inheritance, polymorphism).</li> <li>- Apply OOP concepts to design a banking system.</li> </ul>	<p>Virtual Zoo Banking System</p>
 <b>Challenge Day</b>			
 <p>Advanced Topics in Machine Learning</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Learn feature scaling techniques and their importance</li> <li>- Understand and implement cross-validation for model evaluation</li> </ul>	<p>Feature Scaling Experiment Cross-validation</p>


# Grade 12 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Introduction to Neural Networks</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Learn the basics of neural networks.</li> <li>- Introduction to basics of neural networks.</li> <li>- Application of neural networks to create a superhero name generator.</li> </ul>	<p>Number Guessing intro neural network Superhero</p>
 <p>Fun with NLP and Image Magic</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Understand NLP and image processing; perform sentiment analysis</li> <li>- Application of natural language processing techniques to decode an alien language.</li> </ul>	<p>Movie Review Alien Language Decoder</p>
 Challenge Day			
 <p>Classifier projects(extra)</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Understand decision trees and classification algorithms.</li> <li>- Application of decision tree classification algorithm to build a pet classifier.</li> <li>- Application of decision tree classification algorithm to classify toy items.</li> </ul>	<p>Fruit classifier Pet classifier Toy</p>

# Grade 12 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>Pytorch</p>	<p>3 Sessions 3 Hours</p>	<ul style="list-style-type: none"> <li>- Learn PyTorch basics and tensors.</li> <li>- Practical experience in using PyTorch for basic arithmetic operations like addition.</li> <li>- Understanding of how to implement basic mathematical operations</li> </ul>	<p>Introduction to PyTorch with Tensors addition Simple Calculator with PyTorch</p>
 <p>AI Basics</p>	<p>1 Session 1 Hour</p>	<p>AI project Life Cycle</p>	<p>AI project Life Cycle</p>
 <p>Challenge Day</p>			
 <p>Reinforcement learning and Q-learning</p>	<p>2 Sessions 2 Hours</p>	<ul style="list-style-type: none"> <li>- Basics of reinforcement learning; build a maze-solving agent using Q-learning .</li> </ul>	<p>Simple Maze Solver tick tack toe</p>

# Grade 12 (AI)

UNIT NAME	LESSON FORMAT	LEARNING OBJECTIVES	LESSON PLAN
 <p>creative writing and text generation</p>	1 Session 1 Hour	- Use AI for creative writing tasks "	story generator
 <p>Introduction to NLTK</p>	3 Sessions 3 Hours	- "Introduction to NLTK "	Words and Sentences Tokenizer Stemming and Lemmatization Finding Synonyms for words
 <p>Presenting Your Invention</p>	5 Sessions 5 Hours	Leadership Collaboration Creativity Communication Resilience	Demo Day

# Curriculum Alignment with International Standards

This curriculum builds essential skills in technology, innovation, and critical thinking, aligning with international standards.

## IB Alignment :



**Inquiry-Based Learning:** Encourages design thinking and problem-solving.



**Interdisciplinary Learning:** Integrates STEM for a holistic approach.



**Global Context:** Focuses on real-world problems and global awareness.



**Skill Development:** Cultivates critical thinking, collaboration, and adaptability.

## CSTA Alignment :



**Computational Thinking:** Enhances problem-solving through logic and algorithms.



**Programming & Algorithms:** Emphasizes coding and data analysis.



**Data & Networks:** Covers AI, networking, and data management.



**Ethics:** Discusses AI ethics and societal impacts.

## Cambridge Alignment :



**Math & Science:** Strengthens logic and scientific inquiry.



**Practical Learning:** Promotes hands-on, experimental learning.



**Critical Thinking:** Prepares students for real-world problem-solving.



**Technology:** Focuses on integrating tech for future readiness.

***#DareToInnovate***

