



**SCALEOPAL  
LABS**

# COGNITIVE AI & ADVANCED ROBOTIC LAB

## INNOVATION HUB

Empower your child with elite Robotics & AI skills through an attainable path to the future.



Refining Analytical  
Thinking



Amplifies  
Intellectual Agility



Acquire Engineering  
Proficiency



Empowers Inner  
Leadership

**ROBOTICS**

**ARTIFICIAL INTELLIGENCE**

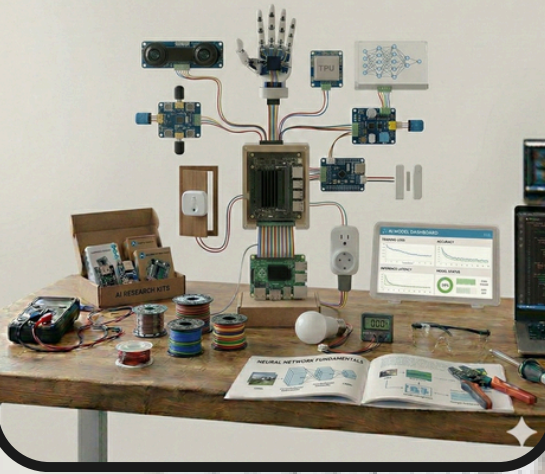
**IOT**

**THE MODERN MAKER'S  
TECH STACK**

**ELECTRIC VEHICLE**

**ENTREPRENEURSHIP**

**DRONE**





# GRADE 1

## Magic of Machines

- What is a machine?
- How do machines help us?
- How do we control a machine?
- What is a Robot?
- Types of Robots

**Mega Project: The Human Hardware Relay**

## Code & Create

- Exploring 3D World
- 3D Pen Basics: Drawing in the Air
- Building 3D Geometric Glasses
- Circuit Loops and Pathfinding
- Code Block Adventures (Motion)

**Mega Project: The Tower Challenge**

## Innovation Hub

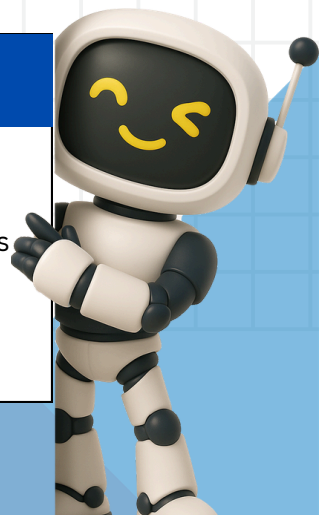
- Conductors (Metal) vs. Insulators (Plastic)
- Battery, LED, and Wire Identification
- Understanding the "On/Off" Switch
- Powering a Motor for the first time
- Intro to AI: Can a Machine Think? (Human vs. Bot)

**Mega Project: The Great Cable-Pull Challenge**

## Welcome to the World of AI

- Discovering the Magic of AI
- What is Artificial Intelligence?
- Playing Games with AI: Quick, Draw!
- How AI Recommends Your Favorite Videos
- Chatting with Friendly AI Bots

**Mega Project: The Super-Processor Challenge**





# GRADE 1

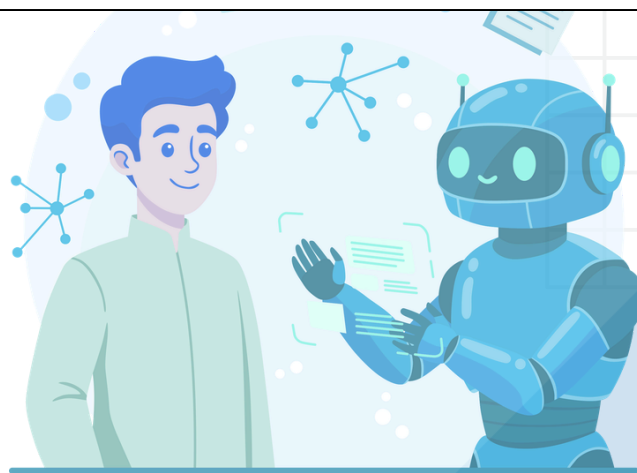
## Lab Leaders

- The Magic of Electricity & Safety Rules
- Safety Protocol for Lab Tools
- Creative Problem Solving
- Super Teamwork
- Final Presentation to Peers

**Mega Project: The 30-Second Commercial**

## OUTCOME

- Foundational Engineering & Mechanics
- Early Computational Thinking
- Practical Electronics & Circuitry
- Foundational AI Literacy
- Collaborative Problem-Solving
- Effective Communication & Presentation





# GRADE 2

## Magic of Machines

- Differences Between Humans and Robot
- Robot Anatomy: Inputs vs Outputs
- Real-world Robots: From Factories to Space
- Intro to AI: Can Robots See?
- Sensors and Their Kinds

**Mega Project: Balloon-Powered Rovers**

## Code & Create

- Deep Dive into 3D
- 3D Name Tags
- Tallest Tower Challenge
- Maze Design Logic and Puzzles
- Diving Into Code Blocks

**Mega Project: The Maze Circuit**

## Innovation Hub

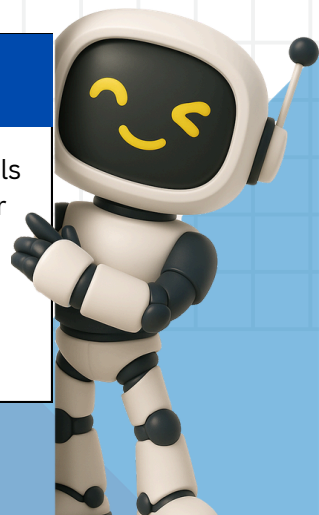
- Motors & Their Kinds
- Power Generation with Motor
- Paper Circuit Robot
- Traffic Light Simulation
- Auto-Switching Lamp

**Mega Project: Cardboard Robotic Hand**

## Creating with AI

- Becoming an AI Artist
- Creating Amazing Pictures from Words
- Writing Fun Stories with AI
- Making Music with Smart Tools
- Designing Your Own AI Avatar

**Mega Project: The AI Character Forge**





# GRADE 2

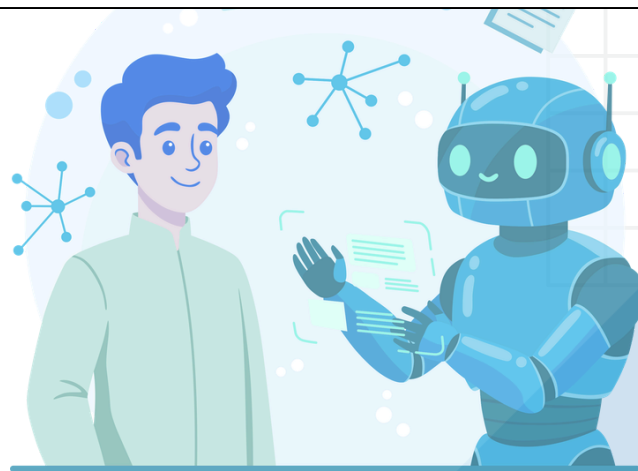
## Lab Leaders

- Introduction to Peg Boards
- The Tool Chest
- Ask Why?
- A Good Teammate
- Final Race & Grip Challenge

### Resource Management & Negotiation

## OUTCOME

- Robotic Anatomy & Sensor Systems
- Applied 3D Design & Algorithmic Logic
- Intermediate Electronics & Circuit Prototyping
- Generative AI & Digital Creativity
- Mechanical Engineering & Diagnostic Troubleshooting
- Collaborative Assembly & Analytical Thinking





# GRADE 3

## Professional

- Sensors
- Working of sensor
- Types of brain
- HumanVs Robot brain
- Arduino uno brain

**Mega Project: Burglar alarm**

## Code & Create

- 3d printer
- Printing a thing
- tinkercad
- Scratch Dashboard
- Scratch Animation

**Mega Project: Scartch Story Animation**

## Innovation Hub

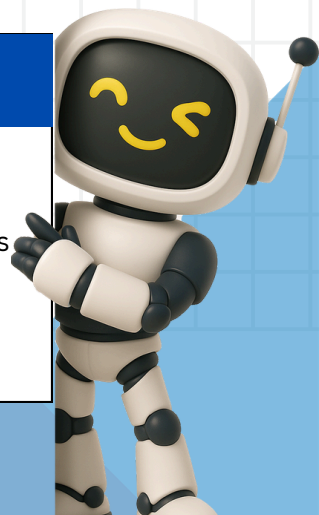
- Rotational vs. Linear Motion
- Deep Dive in the world of Motors
- Understanding DC Motor Polarity
- What is Artificial Intelligence
- AI in Robotics

**Mega Project: Variable Speed Fan**

## The World of AI

- Discovering the Magic of AI
- What is Artificial Intelligence?
- Playing Games with AI: Quick, Draw!
- How AI Recommends Your Favorite Videos
- Chatting with Friendly AI Bots

**Mega Project: Boundary Brainstorm: Rule or Camera?**





# GRADE 3

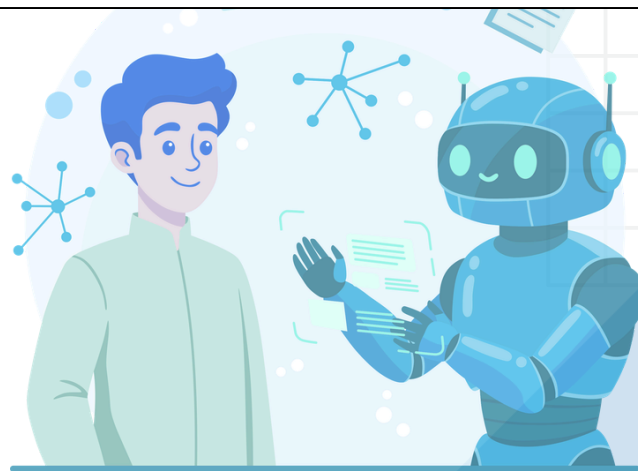
## Lab Leaders

- Introduction to AR/VR
- Energy/ Power supply
- Active Listening
- Public Speaking
- Eco-Tech Project Presentation

**Mega Project: Green City Explorer (AR/VR)**

## OUTCOME

- Automated Systems & Microcontroller Fundamentals
- 3D CAD Modeling & Interactive Programming
- Electromechanical Motion & Motor Dynamics
- Applied Artificial Intelligence in Robotics
- Energy Systems & Immersive Technology (AR/VR)
- Technical Communication & Project Presentation





# GRADE 4

## Professional

- Meet the "Brain": Microcontroller Anatomy
- Hardware vs. Software
- Deep Dive into Expansion Boards
- Digital vs. Analog Signal Basics
- USB and Data Transfer Principles

**Mega Project: The Smart Nightlight**

## Creative

- Introduction to MakeCode
- Block-Based Intro
- Logic Gates: "AND" and "OR" blocks
- Sprite & Character Design
- 3D Printers & Robot Body

**Mega Project: Logic Robot Animation Studio**

## Innovation Hub

- Basic Circuit Troubleshooting
- Sensing Light: The LDR Sensor
- Sensing Sound: The Microphone Module
- Managing Power
- 1. Solar-Powered
- 2. Wind-Powered

**Mega Project: Clap Activated Light**

## Scratch: The Game Creator

- Sprite Physics & Controls
- Broadcast Messaging
- Variables & Scoring
- Face & Emotion Detection
- Voice Commands

**Mega Project: The AI Expression Mimic**





# GRADE 4

## AR/VR

- Intro to Augmented Reality
- Intro to Virtual Reality
- Marker-Based AR
- Intro to 3D Space
- Intro to VR Environments

### Exploring AR/VR Environment

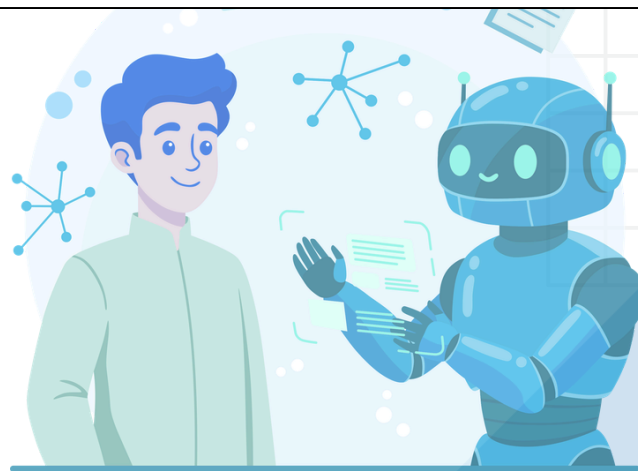
## Lab Leaders

- Deep Dive in the world of AR/VR
- Soldering/Connecting the Components
- Constructive Feedback
- Collaborative Building
- Decision Making

### Mega Project: Lean Builder Auction

## OUTCOME

- Foundational Engineering & Mechanics
- Early Computational Thinking
- Practical Electronics & Circuitry
- Foundational AI Literacy
- Collaborative Problem-Solving
- Effective Communication & Presentation





# GRADE 5

## Junior Arduino Programmer

- Types of Cables
- What is Arduino?
- Working with Arduino
- Arduino Inputs and Outputs
- Introduction to Serial Monitor of Arduino

**Mega Project: Arduino Smart Signal Board**

## Tinkercad Foundations

- Navigating Tinkercad
- Drag-and-Drop
- Powering Up
- The Essentials
- Measurement Tools

**Mega Project: Virtual LED Tester Board**

## Innovation Hub

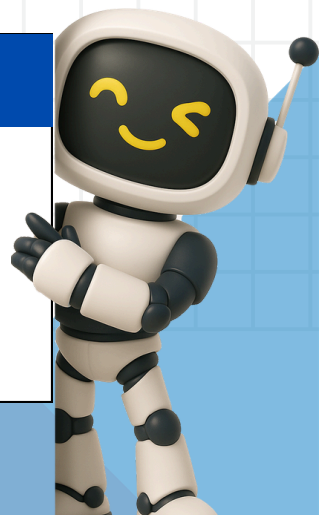
- Arduino Integration
- Visual vs. Textual Code
- No-Code Logic Gates
- Debugging Simulations
- Data Flow & Decision Making

**Mega Project: Radar Using Ultrasonic Sensor**

## Training the Machine Brain

- Data vs. Information
- Image Recognition
- Sound Models
- AI Ethics & Bias
- Smart Chatbots (Logic)

**Mega Project: Train My First AI**





# GRADE 5

## Introduction to IOT

- What is IoT?
- Introduction to ESP Board
- Understanding Inputs & Outputs
- Powering the ESP
- First ESP Program – Blink an LED

### Mega Project: ESP Smart Light

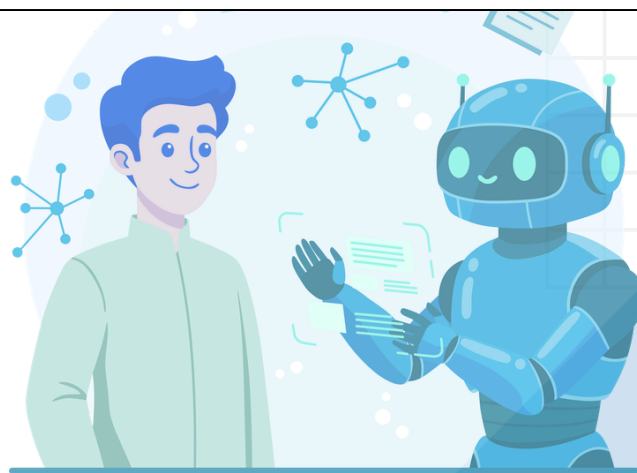
## The World Of Business

- What is Entrepreneurship
- What is a Business?
- What is an Idea
- The Market Research
- Revenue, Loss, & Scalability

### My First Startup

## OUTCOME

- Arduino & Hardware Basics
- Simulation & Digital Logic Thinking
- Early AI Learning Awareness
- Smart Device (IoT) Introduction
- Input-Output System Understanding
- Entrepreneurial Thinking Foundations





# GRADE 6

## The Programmer

- Introduction to Python Programming
- Variables and Data Types in Python
- AI Basic: What is "Big Data"?
- Writing Your First Script
- Understanding Loops

**Mega Project: Smart Number Pattern Finder**

## Tinkercad Simulation

- Analog Control & New Outputs
- Sensing the World:
- DC Motors & Servos
- Block Coding in Tinkercad
- The Smart System

**Mega Project: Intruder Alarm Simulation**

## Innovation Hub

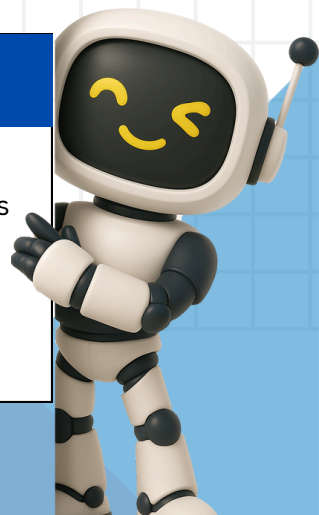
- Conductors vs. Insulators
- Identifying Components
- Understanding the "On/Off" Switch
- Powering Your First Motor
- Can Machines Think?

**Smart Environment Monitoring & Control System**

## The World of AI

- Discovering the Magic of AI
- What is Artificial Intelligence?
- Quick, Draw!
- How AI Suggests Videos
- Chatting with Friendly AI Bots

**Mega Projects: Simple AI Agent Workflow**





# GRADE 6

## IOT

- ESP Pins & GPIO Concept
- Connecting LED & Buzzer with ESP
- Button / Switch as Input
- Introduction to Sensors
- Smart Night Lamp using ESP

**Mega Project: Smart Classroom Assistant with ESP**

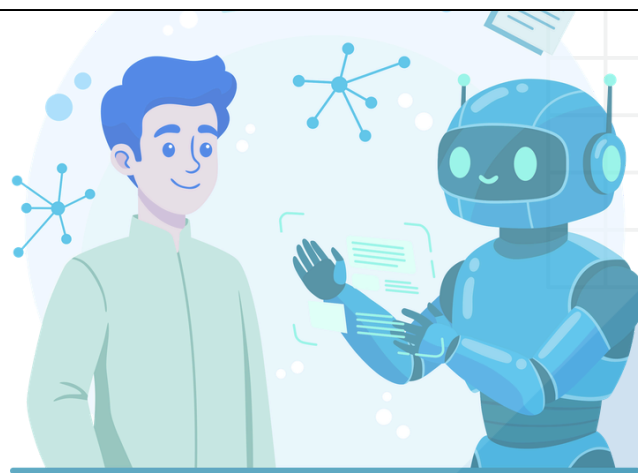
## The World Of Business

- Investments & Sponsorship
- Profit & its types?
- What are Expenses?
- Target Audience
- Product vs. Service?

**The Startup Simulator**

## OUTCOME

- Python Logic Foundations
- Simulation-Based System Thinking
- Sensor & Automation Basics
- Introduction to AI Concepts
- IoT Fundamentals
- Business Awareness & Creativity





# GRADE 7

## The Programmer

- Python Hardware Libraries
- Reading Serial Data from Sensors
- Intro to Machine Learning Patterns
- Conditional Logic
- Data Types for Professional Coding

**Mega Project: Simple Attendance Tracker**

## Creative

- PIR Motion Detection
- Custom Alarm Sounds
- Secure Logic
- Creating a "Security Dashboard" Visual
- User Experience for Security Panels

**Mega Project: Password-Protected Safe**

## Innovation Hub

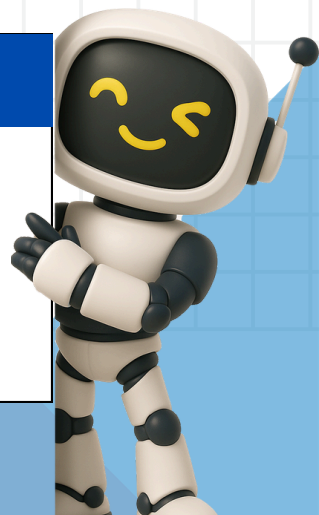
- Wokwi Simulation
- Troubleshooting Code Errors
- Understanding PWM
- Managing Parallel Circuit Logic
- Virtual Testing of Complex Sensors

**Mega Project: Laser Tripwire System**

## AI Logic & Smart Automation

- How AI "Sees"
- Machine Learning (ML)
- AI Sound Sensing
- Confidence Scores
- Dataset & Bias

**Mega Project: Gesture-Controlled LED**





# GRADE 7

## INTERNET OF THINGS

- Analog vs Digital Sensors
- ESP Temp & Humidity
- Serial Sensor Readings
- Conditional Logic
- Smart Weather Monitoring System

**Mega Project: Automated Intruder Alarm**

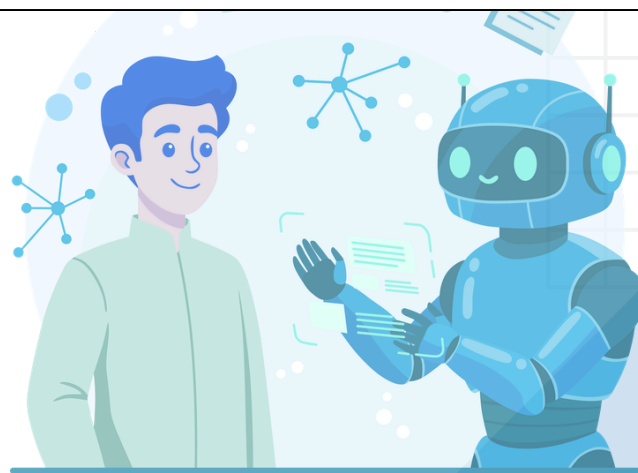
## Entrepreneurship

- Competitor Analysis
- Value Proposition
- The MVP (Minimum Viable Product)
- Brand Identity
- Legal Concept: Intellectual Property (IP)

**The "Sell Me This Brick" Pitch**

## OUTCOME

- Programming & Logic Basics
- Smart Security System Thinking
- Simulation & Debugging Skills
- AI Pattern Recognition Awareness
- Sensor-Based IoT Understanding
- Creative Innovation Mindset





# GRADE 8

## Innovation Hub

- Mobile Network Integration
- Analog Input Mapping & Dual-Axis Control Systems
- Combinational Logic Circuits
- Medical Electronics: Pulse Analysis & Monitoring
- Pressure Measurement

**Mega Project: Sun-Tracking Solar Panel**

## INTERNET OF THINGS

- IoT Concepts: Connecting to the Cloud
- Smart Home Logic Design
- Data Visualization: Reading Soil Graphs
- Designing Warehouse Automation Flow
- Ergonomics in Robotic Tool Design

**Mega Project: Automated Green House (IOT)**

## Connectivity and Cloud Concepts

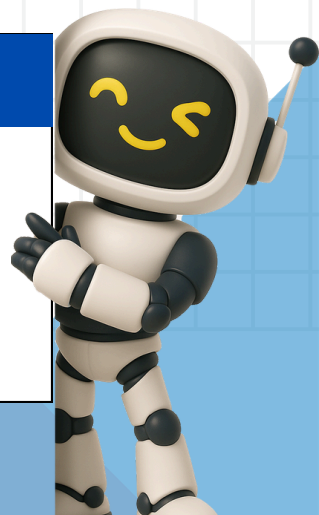
- ESP Wi-Fi Connectivity
- Sending Data from ESP to Cloud
- Viewing Live Sensor Data on Dashboard
- Remote LEDs
- Smart Home Light Control

**Mega Project: IOT Smart Home**

## AI/ML

- Data Strategy (The Foundation)
- Data Refinement (The Preparation)
- Model Development (The Training)
- System Validation
- Deployment & Integration
- Generative VS Agentic AI

**Mega Project: Building & Deploying ML Model**





# GRADE 8

## Drone Technology

- Structural Engineering
- Power & Control Systems
- Communication & Telemetry
- Maiden Flight & PID Tuning
- Adding the "AI"
- Introduction to Electric Vehicle

### Mega Project: Drone Assembly

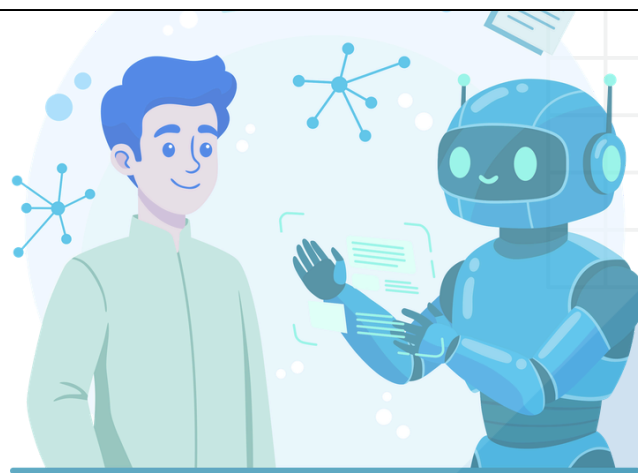
## Entrepreneurship

- Problem Discovery & Customer Persona
- Market Research
- Brainstorm & Benchmark
- Value Proposition & The Lean Canvas
- MVP Development

### Audience Targeting & Lead Qualification

## OUTCOME

- Smart Systems Foundation
- Applied Sensor & Electronics Thinking
- IoT & Cloud Awareness
- AI & Data Basics
- Autonomous Tech Literacy
- Innovation & Problem-Solving Mindset





# GRADE 9

## Professional

- Intro to Edge Computing: Raspberry Pi
- Computer Vision
- AI Basic: Neural Networks
- Image Processing Libraries (OpenCV)
- AI Hardware Anatomy

**Mega Project: Face Tracking Turret**

## INTERNET OF THINGS (IOT)

- Multiple Sensor Integration
- Data Logging & Visualization
- Alerts & Notifications
- Energy Efficiency & Smart Automation
- Smart Agriculture System

**Mega Project: The Smart Home Hub**

## Blender 3D: Modelling for Robotics

- The Blender Dashboard & Movement
- Adding and Moving Shapes
- Modifying the Shape
- Mesh Refinement
- A Quick Challenge: coffee mug

**Mega Project: Custom Machinery**

## AI/ML

- The Anatomy of an Agent
- Cognitive Extensions
- Persistent Knowledge & Retrieval
- Goal Decomposition & Planning
- The Autonomous Control Loop

**Mega Project: RAG Pipeline from Scratch**





# GRADE 9

## EV Technology

- Structural Dynamics & Drivetrain
- Energy Storage & Safety
- The Powertrain
- Drive-by-Wire & Telemetry
- ADAS & Autonomy

**Mega Project: EV System Integration**

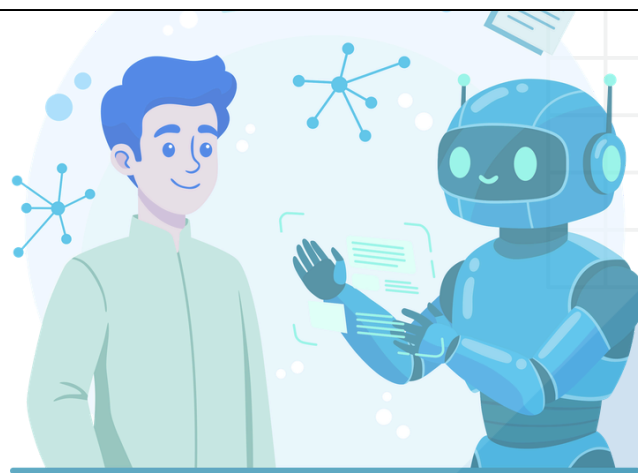
## Entrepreneurship

- Brand Identity
- Legal & Compliance
- Cost Analysis & Pricing Strategy
- Marketing Plan & The Sales Pitch
- The Soft Launch

**Idea Pitching**

## OUTCOME

- Intelligent Systems Thinking
- Applied Machine Learning
- Integrated Hardware & Electronics Proficiency
- Understanding AI Agents
- 3D Design & Prototyping
- Technology Innovation & Startup Mindset





# GRADE 10

## Innovation Hub

- Components of Robot(all)
- Internet of Things & Wireless
- Wi-Fi Enabled Relay Control Matrix
- WiFi/Bluetooth control Rover
- Gyroscopic Posture Control Robot

**Mega Project: Vehicle Tracking & Safety Alert**

## IoT Systems Design using ESP

- IoT System Architecture
- ESP with Actuators
- Introduction to IoT Security & Safety
- Debugging, Testing & Optimization
- Student-Designed IoT Innovation

**Mega Project: Home & Security**

## AI & Robotic

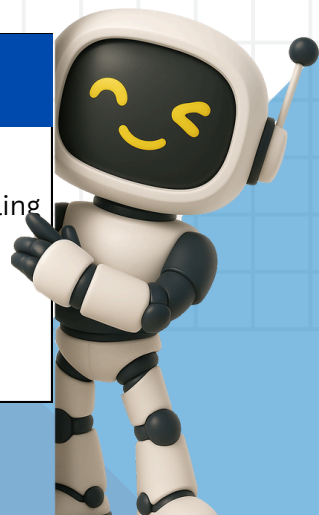
- Components of Robot(all)
- Raspberry Pi
- Hardware Interfacing
- Network Protocols & IoT Gateways
- Edge Computing & Machine Vision

**Mega Project: OpenCV License Plate Reader**

## Agentic AI

- What is an Agentic AI (Revised)
- Agentic Frameworks in Code
- Custom Tool Development
- Multi-Agent Topologies
- Agentic Reflection & Error Handling
- Real-World Deployment

**Mega Project: Multi-Orchestration Agentic System**





# GRADE 10

## Blender 3D: Modelling for Robotics

- The Blender Dashboard & Movement
- Modifying the Shapes
- Merging, Cutting, and Smoothing
- The 90-Degree Corner Gusset
- The 18650 Battery Sled

**Mega Project: Custom Desk Decor**

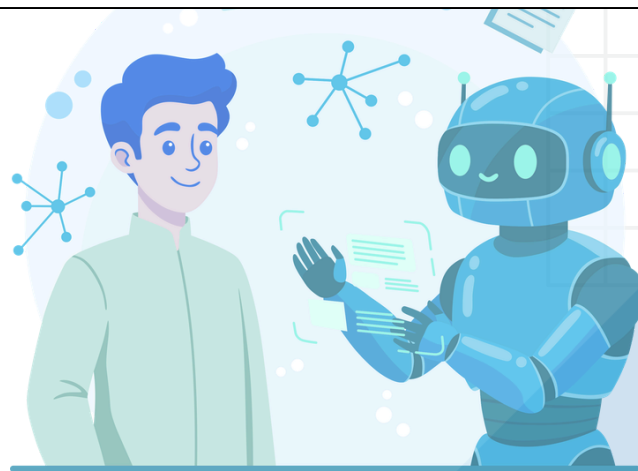
## Entrepreneurship

- Roles & Equity
- Co-Founders & Shareholders
- Funding
- Organization Tree
- Vesting

**Structuring the Founding Team**

## OUTCOME

- Robotic Systems Integration
- IoT Architecture & Connected Device Thinking
- Edge AI & Intelligent Machine Vision Literacy
- Agentic AI & Autonomous System Understanding
- 3D Product Design & Functional Modelling
- Technology Innovation & Startup Mindset





**SCALEOPAL**  
**LABS**

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