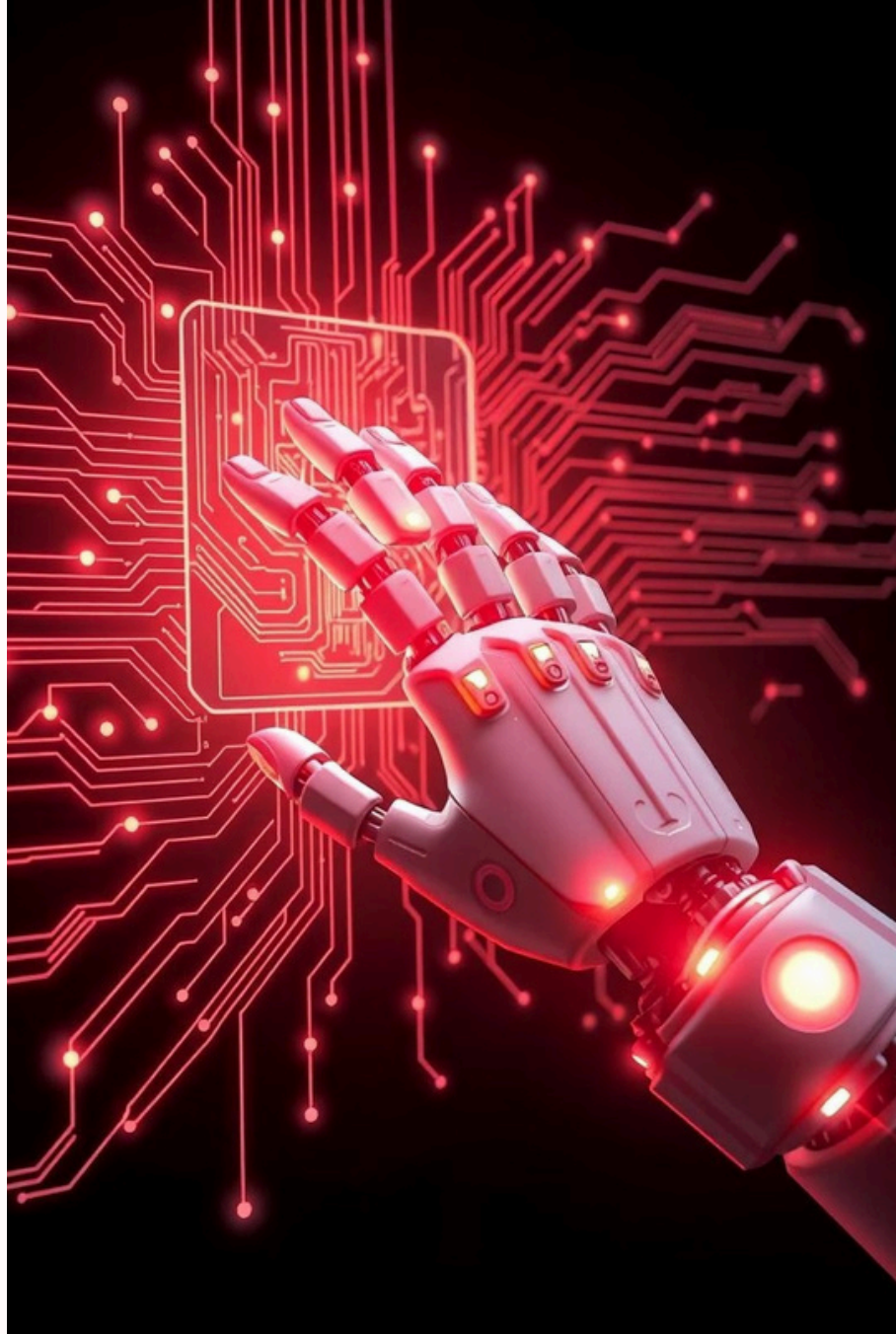
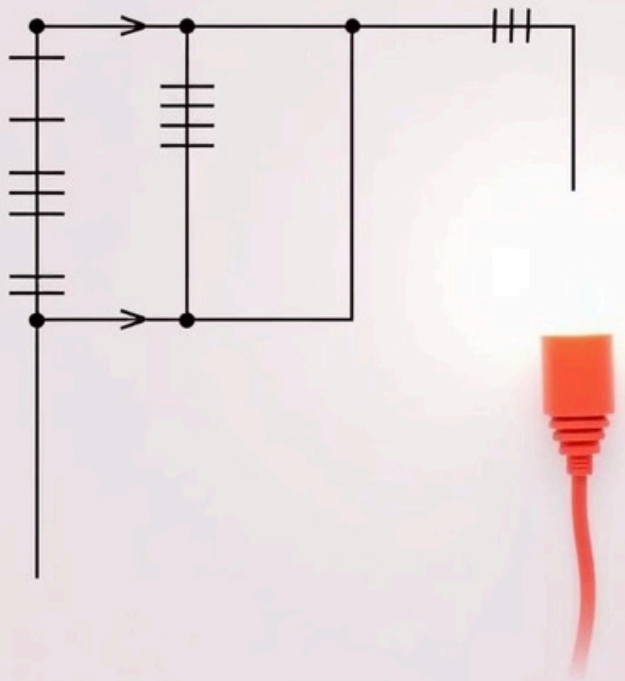
Heritage Status

Lesson Plan: Robotics

This lesson plan outlines a comprehensive robotics course, designed to take students from basic circuit understanding to advanced smart device creation. Over 45 hours, participants will engage in hands-on projects, learning to code Arduino and integrate various sensors to build responsive systems.





Course Overview and Objectives

Topic & Level

Topic: Robotics

Level: Basic to Advance

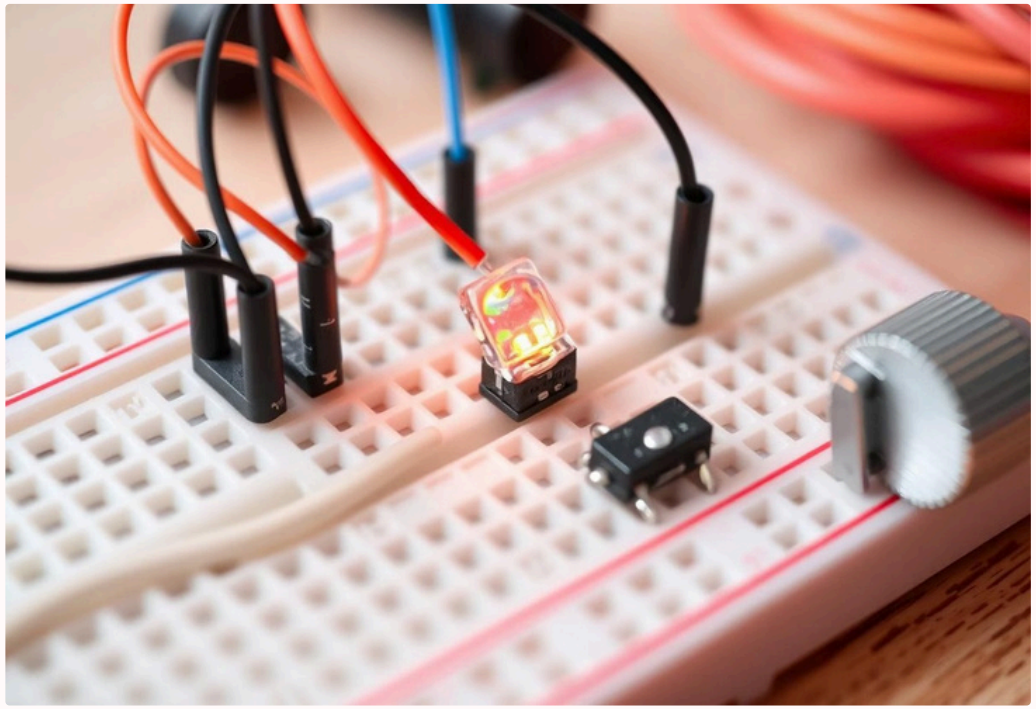
Lesson Duration: 45 hrs.

This course provides students with the foundational knowledge and practical skills to create circuits, utilize resistors, and understand Ohm's law through engaging projects. They will also learn to code Arduino, enabling them to build smart devices that interact with their environment.

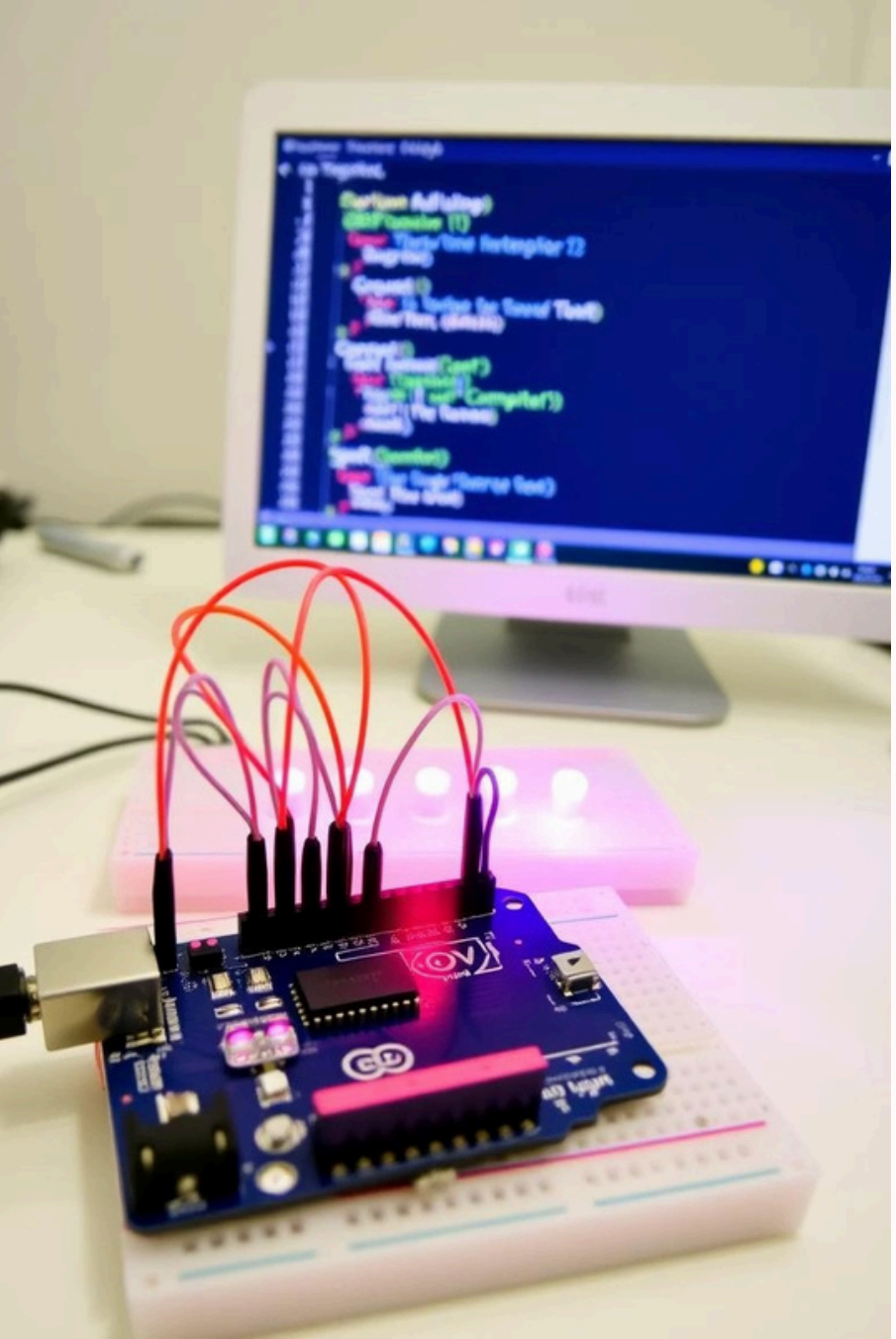
Week 1: Introduction to Basic Circuits

Key Concepts

- Overviewof basic electronics and applications.
- Introduction to RGB with resistor, Light Dependent Resistor, Potentiometer.
- Different types of switches.
- Water level indicator.



Students will begin their journey by exploring fundamental electronic components and their functions. Hands-on experiments will introduce them to various resistors and switches, culminating in a mini-project to solidify their understanding.



Week 2-3: Arduino Basics and LED Control

Week 2: Arduino Setup

Introductionto ArduinoandArduino IDE. Setting up the Arduino board and software. Basic LED code.

MINI PROJECT - 2

Week 3: Advanced LED Control

SwitchandFadingLED. Introduction toRGB with resistor, Light Dependent Resistor, Potentiometer. Traffic light simulation.

MINI PROJECT - 3

These weeks focus on introducing the Arduino platform, a cornerstone for robotics. Students will learn to program basic LED functionalities, progressing to more complex controls like fading and traffic light simulations.

Week 4-5: Sensor Integration and Smart Devices

Week 4: Sound and Light

- LED pattern creation.
- Arduino with Sound sensor.
- Fire Alarm project.

MINI PROJECT - 4

Week 5: Environmental Sensing

- Introduction to temperaturesensors.
- Motion detection.
- Arduino with soil moisture sensor.

MINI PROJECT - 5

Students will delve into integrating various sensors with Arduino to build smart devices. This includes working with sound sensors for fire alarms and environmental sensors for temperature, motion, and soil moisture detection.

Week 6-7: Advanced Sensors and Displays

HumiditySensor

Introduction to humidity sensor interfacing and programming.

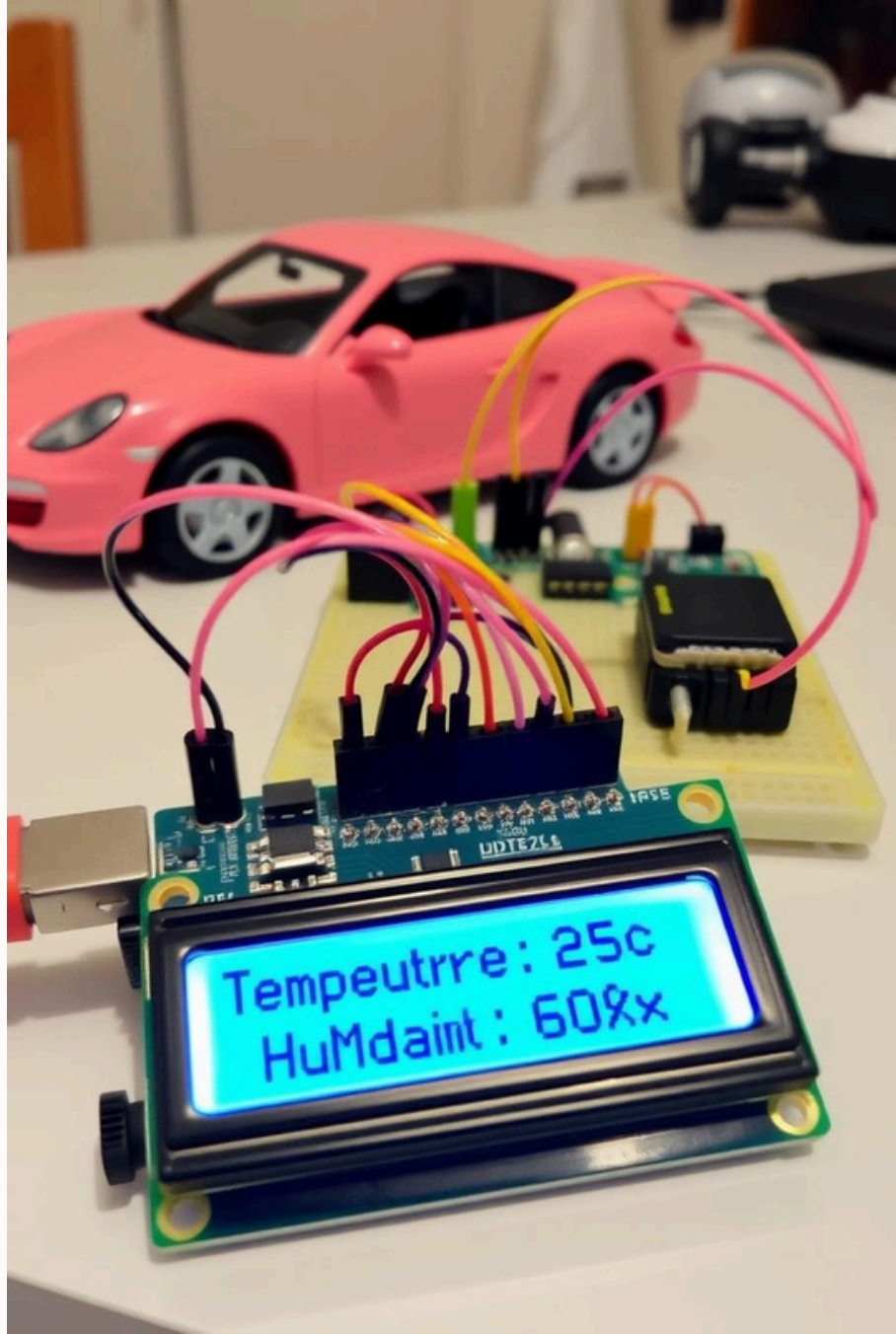
Ultrasonic Sensor

Understanding and programming ultrasonic sensors for distance measurement.

LCD Displays

Interfacing and programming LCD displays to show data and messages.

These weeks focus on more advanced sensor applications and output devices. Students will learn to work with humidity and ultrasonic sensors, and master the art of displaying data on LCD screens, preparing them for complex projects.



Week 8: IoT Integration and Final Projects

IoTConcepts

- Introduction to IoT concepts.
- Connecting IoT to Arduino.

Capstone Projects

- Creating a Smoke Detector.
- Creating a Weather Monitoring Station.

MINI PROJECT - 5

The final week culminates in integrating Internet of Things (IoT) concepts with Arduino. Students will apply all learned skills to build practical, real-world applications such as a smoke detector and a weather monitoring station, showcasing their comprehensive understanding.

Key Takeaways and Next Steps

Comprehensive Skill Development

Students will gain hands-on experiencein circuit design, Arduino programming, and sensor integration, building a strong foundation in robotics.

Practical Application

Through numerous mini-projects, learners will apply theoretical knowledge to create functional smart devices and IoT solutions.

Future Exploration

This course serves as an excellent stepping stone for further studies in advanced robotics, automation, and embedded systems.

Upon completion, students will be equipped with the essential skills and confidence to pursue more complex robotics challenges. The course provides a solid base for innovation in the field of smart technologies.