Basic IoT and **App Development Course**

Sample

Course Overview

This 20-session course is designed to introduce rural students to IoT, app development, and basic electronics using Arduino, basic electronics, Microsoft Azure IoT, and Microsoft PowerApps. Each session is 30-40 minutes long, with a focus on simple, hands-on projects to ensure understanding and engagement.

Session Breakdown

Week 1: Introduction to IoT, Basic Electronics, and App World

Session 1: Course Introduction and Overview

- Objective: Provide an overview of the course, outline the key topics, and set expectations for the students.
- Introduction to IoT: Explain the concept of the Internet of Things (IoT) and its significance in the modern world, especially its potential impact on rural communities (e.g., smart farming, remote health monitoring).

Session 2: Introduction to Basic Electronics

- Introduction to basic electronics components (LEDs, resistors, batteries)
- Simple hands-on activity: Build a basic LED circuit on a breadboard
- Required: Breadboards, LEDs, resistors, batteries, jumper wires

Session 3: Understanding Circuits

- Explanation of circuit diagrams and their components
- Hands-on activity: Create a simple series and parallel circuit
- Required: Breadboards, wires, LEDs, resistors, batteries

Week 2-3: Getting Started with Arduino

Session 4: Introduction to Arduino

- Overview of Arduino and its use in simple projects
- Introduction to the Arduino board and basic components
- Hands-on: Write and upload a simple blinking LED program
- Required: Arduino boards, USB cables, LEDs, resistors, laptops with Arduino IDE

Session 5: Basic LED Project

- Building on the blinking LED project
- Introduction to using buttons with Arduino
- Simple project: Control an LED with a button
- Required: Arduino boards, buttons, LEDs, resistors, jumper wires

Session 6: RGB LED Control

- Introduction to RGB LEDs and their control
- Hands-on project: Create a program to change RGB LED colours
- Required: Arduino boards, RGB LEDs, resistors, jumper wires

Session 7: Using an IR Sensor

- Introduction to IR sensors and their applications
- Hands-on project: Detecting obstacles with an IR sensor and Arduino
- Required: Arduino boards, IR sensors, LEDs, resistors, jumper wires

Session 8: Combining LEDs and Sensors

- Integrating RGB LEDs with IR sensors
- Hands-on project: Create an interactive LED display based on sensor input
- Required: Arduino boards, IR sensors, RGB LEDs, resistors, jumper wires

Session 9: Intermediate Arduino Projects

- Building a more complex project using what has been learned
- Example: A simple traffic light system using LEDs and buttons
- Required: Arduino boards, buttons, LEDs (red, yellow, green), resistors, jumper wires

Session 10: Review and Project Work

- Review of all concepts covered in Arduino sessions
- Hands-on project: Create a mini-project combining LEDs and sensors
- Required: Arduino boards, various sensors, LEDs, resistors, jumper wires

Week 4-5: Introduction to PowerApps

Session 11: Introduction to PowerApps

- Overview of PowerApp Inventor and its uses
- Setting up the App Inventor environment
- Hands-on: Create a simple "Hello World" app
- Required: Laptops with internet access, PowerApp setup

Session 12: Basic App Development

- Using basic components (buttons, labels, textboxes) in PowerApps
- Hands-on: Create a simple login page app
- Required: Laptops with internet access, PowerApp setup

Session 13: Creating Multi-Screen Apps

- Introduction to multiple screens in App Inventor
- Hands-on project: Create an app with navigation between screens
- Required: Laptops with internet access, PowerApps setup

Session 14: Connecting App Inventor to Arduino

- Introduction to Bluetooth modules for Arduino
- Hands-on project: Control an LED using a Bluetooth module and PowerApps
- Required: Arduino boards, Bluetooth modules, LEDs, resistors, laptops with PowerApp setup

Session 15: App to Control Arduino via Bluetooth

- Step-by-step guide to create an app for controlling Arduino
- Hands-on project: Create an app to turn an LED on and off using Bluetooth
- Required: Arduino boards, Bluetooth modules, LEDs, resistors, laptops with PowerApps setup

Week 6-8: Introduction to Microsoft Azure IoT

Session 16: Introduction to Azure IoT

- Simple explanation of cloud computing and Azure IoT
- Setting up a basic Azure account
- Overview of Azure IoT Hub
- Required: Laptops with internet access, Azure accounts

Session 17: Connecting Arduino to Azure IoT

- Sending data from Arduino to Azure IoT Hub
- Use of temperature and moisture sensors for data collection
- Required: Arduino boards, sensors (temperature, moisture), jumper wires, internet access

Session 18: Simple Data Monitoring with Azure IoT

- Monitoring sensor data using Azure IoT Hub
- Hands-on: Displaying real-time sensor data on Azure
- Required: Laptops with internet access, Azure accounts, Arduino boards, sensors

Week 9-10: Introduction to Microsoft PowerApps

Session 19: Getting Started with PowerApps

- Overview of Microsoft PowerApps
- Simple explanation of app development
- Hands-on: Create a basic app to display data
- Required: Laptops with internet access, PowerApps accounts

Session 20: PowerApps Project

- Developing a simple application using PowerApps Canvas
- Hands-on: Create an app to display sensor data collected from IoT devices
- Required: Laptops with internet access, PowerApps accounts

Note:

1) APPSKILLING will need assistance with integrating Microsoft Azure and Microsoft PowerApps into the curriculum.
2) Classes are scheduled to last 40-45 minutes, though the duration may vary based on availability and further discussions.