



## Raspberry Pi Projects 5-6 Syllabus

### Course Goals

#### 1 Linux

Students install a Linux-based operating system and learn to use the terminal window to perform a variety of functions.

#### 2 Python Programming

Students learn the basics of programming in Python which allows them to draw images, control hardware, design games, and more.

#### 3 Electronics

Students learn the basics of circuitry and how to interface with the Raspberry Pi using various hardware.

### Course Topics

#### 1 Linux Commands

Students install Raspbian and learn to use basic terminal commands to create, delete, move, and run files.

#### 3 Camera

Students learn to operate the Raspberry Pi camera.

#### 4 Python

Students learn basic principles of programming through the Turtle library and game editing.

#### 5 Sonic Pi

Students learn to use Sonic Pi to create their own music through code.

#### 6 Circuitry

Students learn the basics of electrical theory and familiarize themselves with the breadboard.

#### 7 GPIO

Students learn to use the Raspberry Pi's GPIO pins to interface with different types of hardware.

### Course Schedule

#### Day 1

##### Course Introduction

Students are introduced to the classroom, their peers, and the instructor.

##### Setting up the Pi

Students set up their Raspberry Pis and familiarize themselves with the components.

##### Installation

Students install the Raspberry Pi OS.

##### Pi Games

Students get a feel for their computers after installing the operating system and setting up their Pis and learn what they can do by

playing the Raspberry Pi's pre-installed games.

## Day 2

### Introduction to Linux

Students learn to navigate through directories and practice performing operations like adding, moving, and deleting files.

### Programming with Turtles

Students learn basic programming concepts while using Python's Turtle module to draw shapes and patterns.

## Day 3

### Programming with Turtles

Students learn basic programming concepts while using Python's Turtle module to draw shapes and patterns.

### Lights, Camera, Action!

Students learn to connect and take pictures with the Raspberry Pi camera.

## Day 4

### Lights, Camera, Action!

Students learn to connect and take pictures with the Raspberry Pi camera.

### LEDs and Circuitry

Students learn the basics of electrical circuitry and be able to illuminate an LED on command using code.

## Day 5

### LEDs and Circuitry

Students learn the basics of electrical circuitry and be able to illuminate an LED on command using code.

### Change the Game

Students modify the various built-in games on the Raspberry Pi to familiarize themselves with simple game design concepts.

## Day 6

### Change the Game

Students modify the various built-in games on the Raspberry Pi to familiarize themselves with simple game design concepts.

### Lucky Number 7

Students apply their knowledge of basic circuitry to the more complex 7-segment LEDs.

## Day 7

### Fast Enough

Students use what they have learned about circuit-building and programming to implement a simple 2 player reaction time game.

## Day 8

### Music to My Ears

Students create their own music through code using Sonic Pi.

## **Day 9**

### **Minecraft Pi**

Students apply what they know about coding and the Linux terminal to manipulate the Minecraft game world.

## **Day 10**

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