

SECONDARY CREATIVE COMPUTING CURRICULUM (SCC 1)

JSS 1

FUN ELECTRONICS II (ARDUINO USING BLOCK PROGRAMMING)

TERM OUTCOMES

By the end of this term, the students will be able to create advanced projects using **Arduino** through the application of **wiring schematics** thus consolidating on the knowledge obtained in the first term.

Why use Arduino? Devices are a part of our everyday operation. This enables people perform simple to complex tasks which may cause time wastage or be boring to do daily. With **Arduino**, prototype of devices which carry out tasks are designed with ease thus allowing engineers test their ideas before creating the original product.

Since **Arduino** is an easy to use programmable microcontroller, it is the platform on which we are to create hardware projects which solves problems identified. Throughout this course, problems in the school's environment will be identified and **Arduino** will be used to proffer a solution where appropriate.

WEEKS	TOPICS	CONTENT	PERFORMANCE OBJECTIVES
FIRST WEEK	INTRODUCTION: DEMO PROBLEM-SOLVING ARDUINO PROJECTS	The concept of ideation and the problem solving process is introduced. Videos of problem solving applications, Arduino and Makey Makey , are displayed to the students. Project based on Makey Makey is displayed to the students.	At the end of this lesson, the students should be able to: <ul style="list-style-type: none"> - Identify problem(s) within their environment - Proffer possible solutions to the problem. - Link the solution with the capability of Arduino. - Think through in abstract terms the steps to complete the project.
SECOND WEEK	LIGHT EMITTING DIODE (LED)	UNDERSTANDING LEDs <ul style="list-style-type: none"> - What is an LED? - Identification and uses of the types of LED - Symbol of an LED in a circuit diagram 	At the end of this lesson, the students should be able to: <ul style="list-style-type: none"> - Identify the types of LEDs. - Identify where each type of LED is found. - Identify the symbol of an LED in a circuit diagram.

THIRD WEEK	RESISTORS	DIFFERENT TYPES OF RESISTORS AND THEIR COLOUR CODING CALCULATIONS <ul style="list-style-type: none"> - What is a resistor? - Uses of a resistor in various scenarios - Calculating the colour coding of resistors - Symbol of a resistor in a circuit diagram 	At the end of this lesson, the students should be able to: <ul style="list-style-type: none"> - Identify the types of resistors. - Identify the uses of resistors. - Calculate the resistance of a resistor based on the colour coding - Identify the symbol of a resistor in a circuit diagram.
FOURTH WEEK	CIRCUIT DIAGRAMS	READING CIRCUIT DIAGRAMS LEARN CIRCUIT SYMBOLS OF: <ul style="list-style-type: none"> - Switches - LED - Batteries - Wires - Lamp LEARN TYPES OF CIRCUIT <ul style="list-style-type: none"> - Series circuit - Parallel Circuit - Open circuit - Closed Circuit 	At the end of this lesson, the students will be able to: <ul style="list-style-type: none"> - Identify the circuit symbols and relate them to electronic components - Read and understand a simple circuit - Create a simple circuit on paper - Implement a simple circuit using the circuit diagram as a guide - Understand the types of circuits and be able to replicate them.
FIFTH WEEK	ADVANCED CIRCUITS ON BREADBOARD	CURRENT FLOW IN CIRCUITS AND BREADBOARDS LEARN ABOUT <ul style="list-style-type: none"> - Breadboard current flow rules - Harnessing breadboard flow rules to create complex circuits - LED placement to utilize breadboard space - Pin and non-pin jumper wire 	At the end of the lesson, the students should be able to: <ul style="list-style-type: none"> - Illustrate the breadboard current flow rules - Harness the flow rules to create complex circuits - Read circuit diagrams that are based on breadboard voltage flow - Connect multiple LEDs on a breadboard - Use the pin and non-pin jumper wire to make complex connections
SIXTH WEEK	CORRECTING THE BEHAVIOUR OF COMPONENTS	READING DATA OVER SERIAL MONITOR LEARN ABOUT	At the end of the lesson, the students should be able to:

	CONNECTED TO ARDUINO	<ul style="list-style-type: none"> - Connecting to the serial port using <i>Serial.begin</i> command - Sending data to the serial monitor using <i>Serial.print</i> or <i>Serial.println</i> command - Difference between <i>Serial.print</i> and <i>Serial.println</i> - Access the serial monitor so as to read data from it. - Interpreting the data displayed on the serial monitor so as to understand components' behaviours 	<ul style="list-style-type: none"> - Use the <i>Serial.begin</i> command to connect to the serial port - Use the <i>Serial.print</i> and <i>Serial.println</i> commands to send data from the serial port to the serial monitor - Tell the difference between <i>print</i> and <i>println</i> commands - Open the serial monitor and interpret the data displayed
SEVENTH WEEK	SENSOR: ULTRASONIC SENSOR	DETECTING OBJECTS WITHIN RANGE USING THE ULTRASONIC SENSOR LEARN ABOUT: <ul style="list-style-type: none"> - The uses of the ultrasonic sensor - Connecting the ultrasonic sensor to the breadboard and Arduino - Coding the Arduino board to use the ultrasonic sensor to detect objects within range - Connecting the ultrasonic sensor to the serial monitor 	At the end of the lesson, the students should be able to: <ul style="list-style-type: none"> - Understand the various uses of the ultrasonic sensor - Properly connect the ultrasonic sensor to the Arduino board. - Write codes that instruct the Arduino board to control the ultrasonic sensor - Monitor the behavior of the ultrasonic sensor using serial monitor
EIGHT WEEK	SERVO MOTOR	WORKING WITH SERVO MOTOR LEARN ABOUT: <ul style="list-style-type: none"> - What a servo motor is - Connection of a servo motor to the breadboard - Coding a servo motor using sketch - Controlling the rotation of the servo motor 	At the end of the lesson, the students should be able to: <ul style="list-style-type: none"> - Identify a servo motor - Understand what a servo motor is used for - Properly connect a servo motor to a breadboard - Control the rotation of a servo motor
NINTH WEEK	SCHOOL PROJECT (AUTOMATIC WATER TANK REFILL DEVICE)	BUILDING AN AUTOMATIC WATER TANK REFILL DEVICE	At the end of the lesson, the students should be able to: <ul style="list-style-type: none"> - Understand how to build the project - Explain how the refill device works

		<ul style="list-style-type: none"> - Demo of an automatic water tank refill device <p>COMPONENTS TO BE USED</p> <ul style="list-style-type: none"> - Servo motors - Ultrasonic sensor - Transparent plastic containers 	<ul style="list-style-type: none"> - Begin building the project
TENTH WEEK	SCHOOL PROJECT (AUTOMATIC WATER TANK REFILL DEVICE)	<p>BUILDING AN AUTOMATIC WATER TANK REFILL DEVICE</p> <ul style="list-style-type: none"> - Continuation of the project 	<p>At the end of the lesson, the students should be able to:</p> <ul style="list-style-type: none"> - Complete the project - Make a presentation on the project

