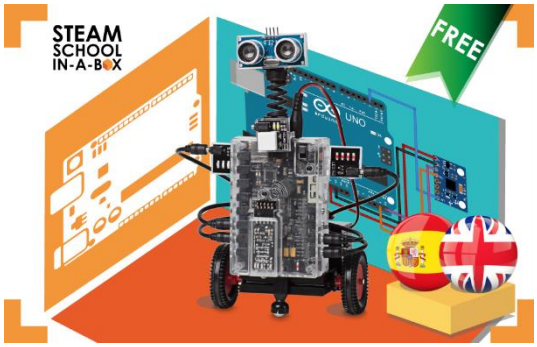
INTRODUCTION TO ARDUINO



You will learn the basics of electronics and Maker engineering with a simple project: assemble an electric circuit that turns on a LED when a button is pressed.

You will use a development environment, called Ardublock, in which you will use blocks to program. You will be able to identify the different parts of an Arduino board, create circuit prototypes on a breadboard and use different actuators and sensors.

Recommended course and / or school stage:
Secondary Education

Recommended age:
For a range of ages

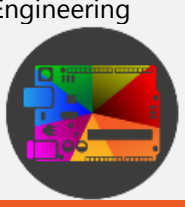
Languages:
☒ Spanish ☒ English

Estimated teaching hours:
12 hours

Technologies:
Arduino, Ardublock

Curriculum and key competencies:
BOCM 48/2015

Course accreditation / Technological Youth Passport
The contents of this course are part of the qualification of: Expert in Maker DIY Engineering



Technological objectives:

- Classify the basic components of a direct current circuit: power supply, resistors, switches, light bulbes
- Use fixed value resistor
- Use a LED as light emitter
- Correctly identify the pin out of different electronic components
- Calculate current, energy and power consumption values.
- Understand the main electrical variables that explain the operation of these circuits: voltage, intensity, resistance, power and energy
- Calculate the energy and power consumed by a circuit and relate it to the power supply system used

Curricular Skills:

- Use the Arduino IDE interface and its main tools.
- Understand the relationship between Arduino IDE (software), Arduino board and electronic circuits (hardware).
- Learn to program using programming blocks (Ardublock)
- Classify electronic devices: actuators, sensors and others.
- Difference the main electrical variables and the relation between them (Ohm's Law)
- Identify the different types of pins that are on an Arduino board
- Use an electronic simulator to get started in electronics
- Create your first program: Building the electronic circuit and programming
- Use the Monitor Serie
- Learn to use a breadboard
- Know the basic safety rules in the workshop: tools and materials.

Course index:

Presentation of the challenge: turning on an LED using a pushbutton using an Arduino board.

Simulator.

What is a simulator?
Study of the Tinkercad interface.
Modification of electronic devices.
Construction and modification of electronic circuits.

Arduino

What is Arduino?
Arduino software.
- Study of the Arduino interface.

Arduino hardware.
- Electronic plate.
- Microcontroller.
- Digital pins.
- Analogue pins.
- PWM pins.
- Power pins.
- USB port.
- Sensors.
- Actuators.

Protection and connection components.
Preparation of the Arduino board.
Blink the LED of the Arduino board.

Ardublock

What is Ardublock?
Study of the Ardublock interface.
Search for blocks.
Programming Puzzle.
Transfer of blocks to Arduino.

LED

What is a LED?
LED programming.
Mounting the LED in Simulator.
Assembly of the real LED circuit.

Resolution of the challenge.

Programming the challenge.
Assembling the challenge in Simulator.
Assembly of the real challenge circuit.

Flowchart and pseudocode

What is a flowchart?
What is a pseudo code?
Representation of instructions.

Electronic. Direct Current, alternating current

What is the direct current? What is alternating current? Parameters of the alternating signals.
How to convert alternating current to direct current?
What is a diode?
Simulation of the half-wave rectifier.
Simulation of the complete wave rectifier.