



A STEAM project for Empathy, Resilience and Creativity

INTRODUCTION TO ARDUINO

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Summary

This seminar will cover the basics of using Arduino for robotics and automation projects. Students will learn how to program and control various sensors and devices using the Arduino platform. Additionally, the seminar will cover some of the latest developments in robotics and automation, and how these technologies are being used in various fields. This seminar is perfect for students who are interested in pursuing careers in engineering, technology, or related fields.

Key elements

<i>Key elements</i>	<i>Arduino / Robotics / Sensors / Circuits / Simulation / System / Engineering / Electronics / Microcontroller / Soft Code</i>
<i>Subject</i>	<i>Robotics and Automation</i>
<i>Topic</i>	<i>Introduction to Arduino</i>
<i>Age of students</i>	12-17
<i>Preparation time</i>	10 hours
<i>Teaching time</i>	4-6 hours
Online material	teaching
Offline material	teaching
Resources used	

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Trends

Automation in Agriculture / Internet of Things / Smart Home Applications / Motion Activation system / Remote controlled systems / Alarm Systems

21st century skills

Creativity, Critical thinking, collaboration and communication, Information and Communication Technologies literacy

Lesson Plan

Name of activity	Procedure	Time
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Introduction to Circuits' Theory, sensors and Arduino Hardware Basics	<p>Using the .pptx material guide your class through the basic meanings of circuit theory, electronics and sensors.</p> <ol style="list-style-type: none"> 1. Connect those concepts with familiar notions of everyday life (eg. make the connection between sensors and the human sensory system). 2. Make a reference of Ohm's Law and the Arduino hardware basics, such as the board, leds, breadboard, cables etc. Emphasise on the equation and units of measurement, vcc and ground notions. 	<p>1 hour</p>
Software Demonstration	<p>Familiarise your class with the software you are about to use. Indicatively https://www.tinkercad.com/circuits (free and online)</p>	<p>15 min</p>
Circuit Construction	<p>Proceed to the listing of sensors you will be using and their basic documentation and schematic.</p> <p>Use a standard schematic and go step by step constructing the circuit</p>	<p>1 hour</p>
Code	<p>Familiarise your class with the software you are about to use. Indicatively https://www.arduino.cc/en/software (free for download)</p> <p>Proceed to writing the code step by step. You can use a project by:</p> <p>https://www.instructables.com/Arduino-Projects/</p> <p>https://circuitdigest.com/arduino-projects</p> <p>https://projecthub.arduino.cc/</p>	<p>45 min</p>

Assessment

Here we include as an example the image of a rubric teachers can use to assess their students:

Students' and teachers' feedback after the implementation of the Learning Scenario during the Pilot phase of the project

Student feedback

Teacher's remarks

About STEAM EmbRaCe project

This Learning Scenario has been created in the framework of the STEAM EmbRaCe project.

STE(A)M EmbRaCe aims to promote inclusion by engaging and inspiring students from different backgrounds. Students work on real-world STE(A)M problems, which will help develop their cultural empathy, resilience, and creative thinking. The idea is to create digital content which will be ready to be used by teachers in any classroom setting. More specifically, the project will allow the development of a 7-week course and teacher training on how to use the developed material with students.

Find out more about the STEAM EmbRaCe project:

<https://steamingthefuture.gr/steam-embrace/>

Annex 1

Annex 2