A STEAM project for Empathy, Resilience and Creativity

INTERNET OF THINGS

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Summary	
This course is designed to offer students a foundation on the notion of Internet of Things (IoT), including the components, tools and analysis by teaching the concepts behind IoT and examining real - world applications. Students are expected to understand the functionality and significance of IoT, discuss its architecture, operation and potential benefits. Moreover, the course will give students the opportunity to not only explore the relationship between IoT and cloud computing by monitoring real-time data in a low code platform, but also familiarize with basic communication protocols.	
Key elements	
Keywords	IoT / Communication Protocols / Data / Cloud / Sensors / Engineering / Platform / Low Code Programming
Subject	Computer Science
Age of students	12 - 17
Preparation time	8 hours
Teaching time	4 - 6 hours
Online teaching material	-
Offline teaching material	Steam EmbRaCe "Internet of Things" presentation
Resources used	-

Trends

Smart home applications / Wearables / Smart cars / Smart meters / Machine - to - machine communications / Cyber - security / Remotely controlled systems

21st century skills

Creativity / Critical Thinking / Problem Solving / Collaboration and Teamwork / Technology Literacy / Information Literacy / Social Responsibility and Ethics

Lesson Plan

Activity	Description	Duration
Introduction to IoT	Using the Steam EmbRaCe "Internet of Things" presentation, familiarize your students with the meaning of IoT and how it works. Explain what an IoT system is, its purpose and how it works (basic concepts and implementation). Using familiar notions of everyday life, highlight some examples of IoT systems and their operation. Discuss the benefits, advantages and disadvantages of IoT systems (e.g. a smart city system in which cameras enable drivers to avoid congestion).	80 min
Communication Protocols	Cite the most popular communication protocols such as LoRaWAN, and explain their use. Elaborate on the protocol which will be used (e.g. MQTT)	30 min
Software Demonstration	Familiarize your class with the software you are about to use. Indicatively https://thingsboard.io (free and online).	30 min
IoT system setup	Proceed to the step - by - step implementation of an IoT system, using data from sensors such as a temperature sensor and make the system "visible" through add - on gadgets available in the platform.	80 min
Recap and review	Summarize key concepts. Allow time for questions and further discussion.	20 min

SEL practices
The following techniques support self-awareness and self-management which are the two main domains of the CASEL model in social and emotional learning.

At the beginning of the course we identify students' emotional state by following the activity "Practice for identifying emotional state".

At the end of the lesson students reflect upon their work by following the activity of Reflection.

After the reflection they practice the square breathing technique and the aim is for them to learn to practice this every time they are about to begin a challenging activity. |

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

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