

# IoT, Big Data and AI: Innovating STEM Teaching Through Strengthening Teacher Professionalisation

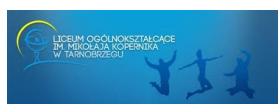
Teacher Training & School Collaboration Programme in the  
Czech Republic, Hungary, Poland & Slovakia

## Programme Overview

This project is supported by



Coordinating Partnering Schools



In collaboration with



# Programme & Activities

## About the Programme

The project “IoT, Big Data and AI: Innovating STEM Teaching Through Strengthening Teacher Professionalisation” engages participating schools in 3 key activities:

- **Activity 1:**  
Training sessions and Development of Teaching Modules on “IoT, Big Data and AI for Innovating STEM Teaching”
- **Activity 2:**  
Virtual Peer-to-Peer Exchange and Knowledge Building Sessions
- **Activity 3:**  
Handbook for Teachers on the “Use of IoT tools to Innovate STEM Teaching”



All activities are documented on the project webpage “[IoT, Big Data and AI: Innovating STEM Teaching in V4 Countries through Strengthening Teacher Professionalisation](#)”.

## Activity 1: Training Sessions & Development of Teaching Modules on "IoT, Big Data and AI for Innovating STEM Teaching"

The main activities of this project focus on a ca. 2-month long Teacher Professionalisation Programme and the development of Teaching Modules that include

- 3 Thematic Training Sessions conducted by the Asia-Europe Foundation (ASEF)
- 5 Technical Training Sessions, 2 of them conducted by the Asia-Europe Foundation (ASEF) and 3 by ScienceScope
- Development of 6 Teaching Modules on "IoT, Big Data and AI for Innovating STEM Teaching" by the participating teachers .

### 1) Thematic Training Sessions

The Thematic Training Sessions will be designed and delivered by education & thematic experts on Education for Sustainable Development, with a focus on environmental and climate change education as well as 21st century skills development. Open for both teacher and students, these sessions will support the learning partnership in a technology rich environment. Each participant - teachers and students - will receive a certificate after the project. The Thematic Training Sessions tackle the following topics:

- **Thematic Training #1** - Understanding “Education for Sustainable Development (ESD)”
- **Thematic Training #2** – Implications of Climate Change, Global Warming, and the Future of STEM
- **Thematic Training #3** – Building the Connection: STEM, ESD and 21<sup>st</sup> Century Skills



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## 2) Technical Training Sessions

The integration of Internet of Things (IoT) and Artificial Intelligence (AI) technologies in people's daily environment is a new concept, especially in education. Therefore, it is important to conduct adequate and relevant technical training sessions for teacher participants to be able to use new tech tools to innovate existing learning settings and to support their students in achieving deep learning goals for STEM subjects. The Technical Training Sessions will be, therefore, conducted for participating teachers to enhance their knowledge on and digital competences in implementing IoT and AI-driven projects' activities. Besides focusing on teaching basic concepts of IoT, Big Data and AI, these sessions will also help participants develop necessary technical skills and an understanding of ScienceScope's IoT Device & Weather Station. The Technical Training Sessions tackle the following topics:

- **Technical Training Session #1** - What is Internet of Things (IoT)? How does it work?
- **Technical Training Session #2** - What is Big Data, what is Artificial Intelligence (AI)?
- **Technical Training Session #3** - Introduction to ScienceScope's IoT device, the Weather Station, and its Relevance to STEM Learning
- **Technical Training Session #4** - IoT, Big Data and AI in an Environmental Context
- **Technical Training Session #5** - Hands on Training – Using ScienceScope's IoT Device and the Weather Station

## 3) Teaching Modules on IoT, Big Data and AI for STEM Classes

As the basis for the Teacher Professionalisation Programme, each participating school will be equipped with an IoT Weather Station to be able to join a number of collaborative activities. The weather station will capture environmental data on the school compound, including temperature, relative humidity, barometric pressure, rain rate and total, solar radiation, UV index, wind speed and wind direction. The environmental data generated by all participating schools will then be compiled by one virtual platform to create an

ecosystem of environmental data for joint analysis and reflection.

After building relevant understanding and knowledge through the technical and thematic training sessions, the participating teachers will work in teams of 3-4 pax to develop 5 Teaching Modules on the topic. Each of the 5 Teaching Modules will address one specific issue linked to the environmental data collection and evaluation (e.g., pollution, natural hazards, etc.). In the process of collaboratively developing these modules, teachers will learn how to practically integrate IoT in their teaching practices as well as enhance their pedagogical capacities to teach 21st century skills. In addition to the teamwork on developing the modules, individual assignments will be given to the teachers for further exploration and to deepen their understanding and confidence in using the IoT tools and the weather station for teaching ESD and STEM. The potential modules will cover environmental areas such as:



### Module #1 - Total Rainfall and Rain Rate

**Dr Andrea Molnarne LASZLO**

Teacher

Márton Bálint Primary and Secondary School  
Hungary



### Module #2 - Temperature

**Ms Jana VIDOVÁ**

Teacher

Obchodná akadémia Rožnava  
Slovakia



### Module #3 - Barometric Pressure

**Mr Pavol TRUBAC**

Teacher

Spojena Skola  
Slovakia



### Module #4 - Windspeed and Wind Direction

**Mr Adam STEPINSKI**

Teacher

Copernicus Upper-Secondary School in  
Tarnobrzeg  
Poland



### Module #5 - Solar Radiation & UV Index

**Mr Milan CHALUPNÍK**

Teacher & Headmaster

Základní Škola, Seč, okres Chrudim  
Czech Republic



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After co-developing these 5 modules, each team will present its module to the whole group for discussion and feedback. These modules will be further enriched with the input from the whole group and then finalised by the ASEF and ScienceScope. All modules will be included in the Project's Handbook that will serve as a resource for teaching STEM and ESD at the secondary education level in V4 and beyond V4 Countries.

### Activity 2: Virtual Peer-to-Peer Exchange and Knowledge Building Sessions

Throughout the project's implementation, virtual meetings are planned to bring together all participating teachers, including their students, for a peer-to-peer exchange and knowledge building & sharing. These virtual sessions of about 1.5 – 2.5 hours each will include various meeting formats, with a focus on interactive engagement of all participants (e.g., speed-dating, polls, and small-group discussions) and collaborative elements (e.g. visual, virtual brainstorming). In addition, the organisers will invite experts from V4 countries for each session, to provide a keynote as food for thought. Coordinated and conducted by teachers for their peers, these sessions are an opportunity for informal and non-formal group learning. The meetings are:

- **Formal Welcome & Introductory** Session
- **2 Peer-to-Peer Knowledge Building** Sessions, to follow up on the Technical Training and the Thematic Training Sessions
- **Closing Session** with presentations of the Teaching Modules as well as Feedback & Evaluation Session

### Activity 3: Handbook for Teachers on “Use of IoT Tools to Innovate STEM Teaching”

The project will conclude with the production of a Handbook on the ‘*Use of IoT Tools to innovate STEM Teaching*’. It will be a joint collaboration between all project partners and participating teachers. Capturing their experiences throughout the project, it will include concrete lessons learnt and guidelines on pedagogical, curriculum & technical related matters based on practical examples. Specifically, the handbook will focus on:

- 1) The process of the project's implementation
- 2) Tangible & intangible results achieved through the project's activities
- 3) Step-by-step guidelines on how to use IoT tools to teach & learn STEM subjects
- 4) Student testimonies on their practical experiences
- 5) References to latest research on teacher professionalisation
- 6) Insights on digital transformation of teaching & learning environments through IoT tools in schools in V4 countries
- 7) Messages from education experts/policy makers in V4 countries

The Handbook will serve as a useful reference for all interested teachers to implement similar activities and support them to innovate their teaching environment for STEM subjects. It will also inform education policy makers about innovation in STEM teaching & learning in V4 countries.

# Programme Timeline

**23 Sep 2021**

**13:30 – 15:00 (CEST)**

**Welcome & Introduction –  
Setting the Scene**

1<sup>st</sup> Meeting between ASEF,  
the partners and participants  
Formal Welcome and getting  
to know each other  
Introduction of the project  
Expectation setting

Facilitated by:  
Ms Leonie NAGARAJAN, ASEF

**04 Oct 2021**

**13:30 – 15:00 (CEST)**

**Thematic Training #1**

Understanding Education for  
Sustainable Development  
(ESD)

Speakers:  
Ms Leonie NAGARAJAN, ASEF  
Ms Jyoti RAHAMAN, ASEF

**03**

**06 Oct 2021 (TBC)**

**13:30 – 15:00 (CEST)**

**Thematic Training #2**

The Implications of Climate  
Change, Global Warming, and  
the Future of STEM

Speaker:  
Ms Grazyna PULAWSKA, ASEF

**13 Oct 2021**

**13:30 – 16:00 (CEST)**

**Peer-to-Peer Knowledge  
Building Session #1**

Peer-to-peer group  
discussions & exchange on  
lessons learnt from the  
thematic sessions

Facilitated by:  
Ms Leonie NAGARAJAN, ASEF  
Ms Jyoti RAHAMAN, ASEF

**11 Oct 2021**

**13:30 – 15:00 (CEST)**

**Thematic Training #3**

Interactive Session on  
Building the Connection:  
STEM, ESD and 21st Century  
Skills”

Speakers:  
Ms Leonie NAGARAJAN, ASEF  
Ms Jyoti RAHAMAN, ASEF

**18 Oct 2021**

**13:30 – 15:00 (CEST)**

**Technical Training #1**  
What is IoT?

Speaker:  
Prof Aleksandra  
PRZEGALINSKA,  
Kozminski University

**05**

**25 Oct 2021**

**13:30 – 16:00 (CEST)**

**Technical Training #3**

Introduction to  
ScienceScope’s IoT Devices,  
The Weather Station, and its  
Relevance to STEM Learning

Speaker & Facilitator:  
Dr David CRELLIN,  
Sciencescope  
Mr Josh WRIGHT,  
Sciencescope

**09**

**27 Oct 2021**

**13:30 – 15:00 (CEST)**

**Technical Training #4**

IoT, AI and Big Data in an  
Environmental Context

Speaker & Facilitator:  
Dr David CRELLIN,  
Sciencescope  
Mr Josh WRIGHT,  
Sciencescope

**22 Oct 2021**

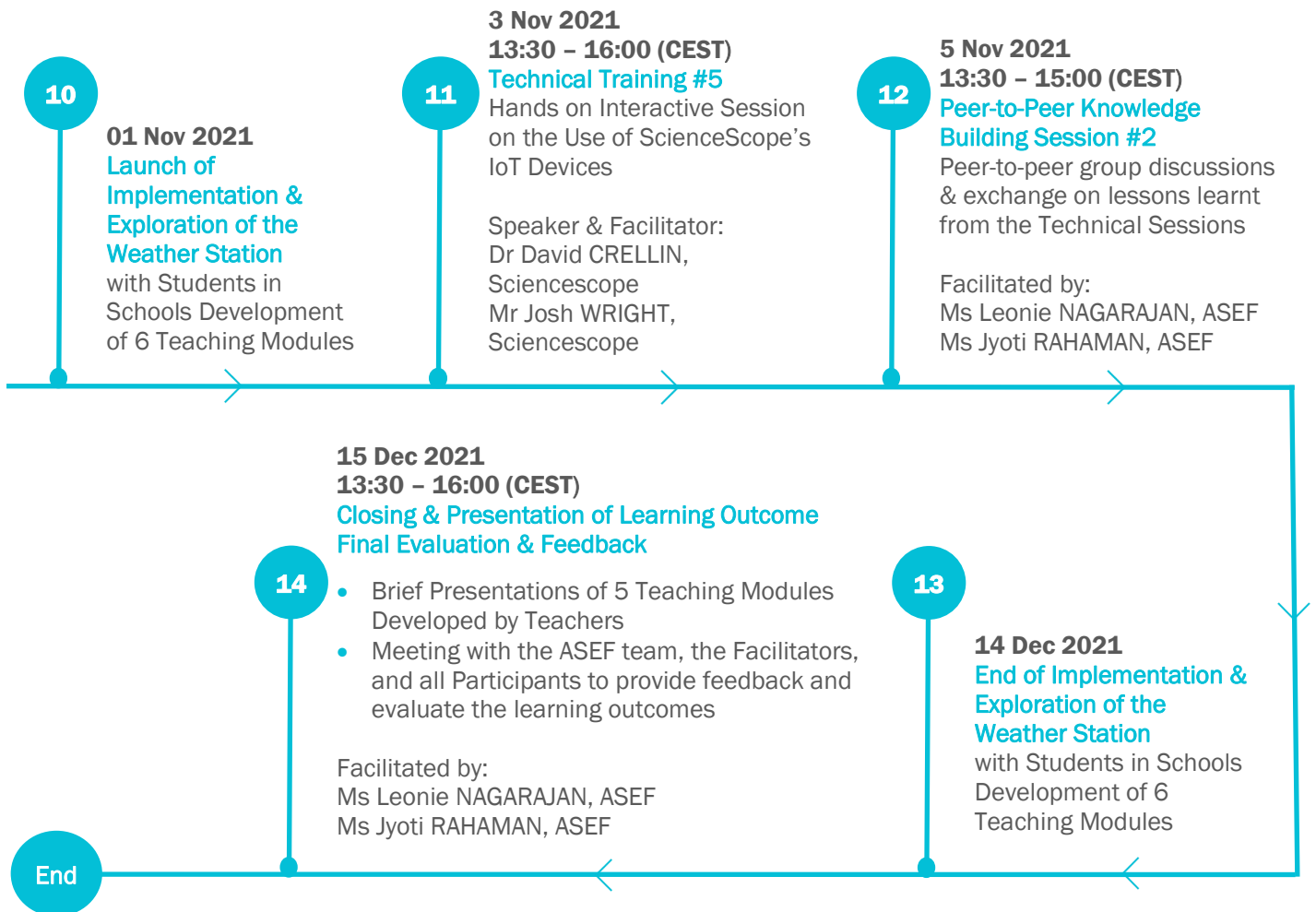
**13:30 – 15:00 (CEST)**

**Technical Training #2**  
What is Big Data, what is  
Artificial Intelligence (AI)?

Speaker:  
Prof Aleksandra  
PRZEGALINSKA,  
Kozminski University

**08**

# Programme Timeline





# Supporters

## Supported by

- Visegrad Fund

The **Visegrad Fund** is an international donor organization, established in 2000 by the governments of the Visegrad Group countries—Czechia, Hungary, Poland and Slovakia to promote regional cooperation in the Visegrad region (V4) as well as between the V4 region and other countries, especially in the Western Balkans and Eastern Partnership regions. The Fund does so by awarding €8 million through grants, scholarships and artist residencies provided annually by equal contributions of all the V4 countries. Other donor countries (Canada, Germany, the Netherlands, South Korea, Sweden, Switzerland, the United States) have provided another €10 million through various grant schemes run by the Fund since 2012. <https://www.visegradfund.org/>

## In Collaboration with



The **Asia-Europe Foundation (ASEF)** is an intergovernmental not-for-profit organisation located in Singapore. Founded in 1997, it is the only institution of the Asia-Europe Meeting (ASEM). ASEF's mission is to promote understanding, strengthen relationships and facilitate cooperation among the people, institutions and organisations of Asia and Europe. ASEF enhances dialogue, enables exchanges and encourages collaboration across the thematic areas of culture, education, governance, sustainable development, economy, public health and media. [www.ASEF.org](http://www.ASEF.org)



**ScienceScope Ltd** is based at Downside School near Bath, in the south west of the United Kingdom. With a focus on developing research projects on Education Technology, the company has been awarded grant funding to develop these projects in multiple countries from around the world including the UK, Singapore and the UAE. They have partnered with a wide range of academic & government partners including the University of Bath and the University of Glasgow in the United Kingdom, the Singapore Infocom and Media Development Authority (IMDA) and the National Institute for Education Singapore. <https://sciencescope.uk/>

## Coordinating & partnering schools

