EDUCATIVE ROBOTICS AND CODING WITH ARDUINO

Objectives

The objectives of the course are:

- Provide teachers with practical ideas on how they can incorporate technology into their lessons;
- Promote basic training on topics such as controls, automatisms, robots and programmable machines;
- Familiarize teachers with current use of robotics and coding in nowadays education trends;
- Providing innovative ways of teaching STEM (Science, Technology, Engineering and Mathematics) using problem solving, object analysis, use of scales...
- Promote new digital competences among teachers;
- Developing actively and constructively students' involvement in the work at class using coding and robotics;
- Enlarge teachers technic vocabulary and familiarize them with different programming languages;
- Exchanging experiences in cooperative and collaborative learning process as long as in creativity and innovation;
- Sharing of good practice in teaching and learning, using coding and robotics, enabling teachers to become confident and competent enough to create an interactive classroom experience for their students.

Target Group

The training course is addressed to primary and secondary school teachers, school directors and IT coordinators and all teaching staff in general who wish to acquire the needed skills for applying coding and robotics with educational purposes.

Language of course

This course will be provided in English. It is requested to all participants to have a level of English enough to understand the trainer and to interact and participate actively in the course.

Methodology

The approach used is highly practical, based on the expertise of the course trainers who have different years' experience. Practical simulations will be carried out for each topic.
The objective of the practical activities is the simulation of the use of robots and coding during lessons.

It is foreseen 4 days of practical lessons and 1 day of visit to a school or organisation dealing with the subjects of the course. Moments of socialisation have been also foreseen.

Programme

Day 1 – 4 hours
Introduction to Robots, automatic and control systems and programming languages

- Welcome meeting. Presentation of programme. Presentation of participants and sharing expectations
- Introduction to control systems and robotics with arduino board
- Robot architecture: Main parts. Sensors and Actuators. Feedback concept
- Flux diagrams and programming. Introduction to coding
- Use of computer as element for coding and control. Control languages. Using scratch in mblock: an easy way to start programming
- An introduction to the arduino board. Inputs and outputs
- Using a protoboard. Connecting sensors and actuators
- Practical use of sensors, controllers and actuators: prototyping

- City Tour – 1 extra hour.

Learning Outcomes:

- ✓ Understand the basics of block programming
- ✓ Creation of animations and video games.

Day 2 – 4 hours
Using mblock for coding Arduino microcontrollers

- Introduction to coding with mblock. Variables and functions. Programming conditioning sentences and loops. Programming communication for serial ports
- Use of sensors with mblock: potentiometer, lights, infrared, ultrasound, button, ...
- Use of peripheral devices in mblock: LEDs, DC motors, servo motors, buzzers...
- Projects: making a digital dice; simple traffic light; two traffic lights; controlling a servo with a potentiometer

Learning Outcomes:

- ✓ Learn to code mbot, lights and sensors.

Day 3 – 4 hours
Using mblock for programming robots

- How to build an educative robot. Recommended tools and components
- Continuous servo motor to move robots
- Making a robot from scratch
- Programming a robot: Robot that hide from lights / Robots that follow lines

Learning Outcomes:

- ✓ Understand how Arduino IDE works and the different elements.
- ✓ Learn to code lights, switch, ultrasonic sensor and servomotor

Day 4 – 4 hours
Robotics applications in the classroom: robots and Physics experiments for school

- Using a commercial educational robot. Introducing mbot.
- Programming mbot: how to avoid an obstacle/ hiding from lights / robot that follows lines
- Time measurement (timer) with arduino board and mblock.
- Galileo's experiment with arduino / Simulating an elevator

Learning Outcomes:

- ✓ Design and creating circuits with Tinkercad
- ✓ Discover and ilplement 3D design and circuits creation
- ✓ Learn to code Arduino potentiometer, IR sensor and DC engine.

Day 5 – 4 hours
Professional visit, Evaluation, Certification and Farewell

- Visiting a school in Valencia
- Evaluation and certification
- Farewell activity.

Learning Outcomes:

- ✓ Foster intercultural exchanges between different cultures and countries
- ✓ Go deeper into how to give and receive feedback
- ✓ Engage in a process of self-reflection through open conversations and new cultural experiences

Quality Commitment

ESMOVIA, as course provider, commit to respect and follow the quality standards for courses under Key Action 1:
https://erasmus-plus.ec.europa.eu/resources-and-tools/quality-standards-key-action-1

Fees

Course fee: 435,60 €/participant VAT included. Possibility of invoicing 360,00 €/participant if sending organization has Intracomunitary VAT number.

This amount includes:

- Preparation for the course
- Tuition
- Training materials
- Administration costs
- Organizational costs
- Professional visit to school
- City tour in Valencia
- Farewell lunch

Requirements

Minimum of 8 participants. For smaller groups, contact us.

Dates

You can find the dates of the course on this link (you have to click on "I´m interested" to see the different sessions scheduled)*: https://school-education.ec.europa.eu/en/professional-development/courses/educative-robotics-and-coding-arduino

*The course will take place if the minimum number of participants is reached.

Please contact us for any other dates.

Courses in ESMOVIA

You can also find a list of all the courses we organize in ESMOVIA on this link: https://www.esmovia.es/en/training-and-mobility/teachers/professional-development-courses/

Contact

Clemence Hugon
Groups Coordinator
hugon@esmovia.es
+34 963 38 46 20
Skype: hugon_19