⚙Robotics

in Schools 📖

Course for Primary School Teachers in Palma de Mallorca, Spain

The course contains 27 hours of guided tuition over 5 days and 2 introduction and closing days.

Target: Primary School Teachers, who develop new teaching methodologies.

Below is the programme for Robotics for Schools.

General Objectives:

Technology and Robotics are not only part of the specialised area of engineering, but they are also fully integrated into everyday life in society. Many European schools now reflect the need to integrate these subjects into their curricula, such as: Technology, Computer Science and Programming/Coding. That are beginning to reappear, creating increasing demands upon teachers at all levels, from primary level education to upper secondary school and beyond.

Our proposed teaching methods for teachers are based on the fact that pupils live and see those abstract concepts into their practical day-to-day life (opening the doors of a supermarket, home vacuum cleaner, airplanes, pulleys, domestic robotics and domotics, etc.). Through this methodology, pupils can experiment and internalize these scientific principles and rules, and as well as becoming able to create their own developments.

Our methodology also support to enhance pupils' creativity, their teamwork capability and motivation.

Preliminary Programme - PRIMARY SCHOOL

1. DAY - WELCOMING & INTRODUCTION	
PROGRAMME	**Learning Objectives**
- Welcome of participants - Course Introduction (program, aims and objectives) - Brainstorming & Team building activities - Guided Tour to Palma de Mallorca	- Participants' presentation and the introduction of course topics - Sharing experiences and expectations - Team-building activities - Guided tour of the city

2. DAY - LEGO WEDO

Lego Wedo 1 is a very attractive educational resource, which support pupils´ with the first steps of programming. Lego Wedo is capable to create a very interesting, playful and fun learning environment. With LEGO® Education resources children create their own basic-robots that will be then animate through programming. This activity will empower your pupils with the skills to design and programming a series of robots (from the easier one to the more complex). This activity allows children to be trained on mathematical and physics aspects from an interactive point of view.

Lego Wedo 2 will add new possibilities to learn and to introduce wireless-functions, which will allow them to build new robots capable to move in a wider space with more freedom. Furthermore, this technique will offer teachers the possibility of combining it with contents proper of the natural sciences, such as speed, recycling, metamorphosis, etc.

PROGRAMME	Learning Objectives
- Activity explanation - To know the working material - To know the electronic components - How to use the software - Wedo 1 in practice - Basic session - Wedo 1 in practice - Complex session - Wedo 2 in practice - Basic session - Wedo 2 in practice - Complex session	Through this tool, pupils will develop the following Knowledge, Skills and Competences: **Science:** a) gear management; b) energy transfer; c) leverage functions; d) knowledge of the function of the pulley and the clutch. **Technology:** a) 2D and 3D programming; b) comparing natural and mechanical phenomenon; c) use of softwares. **Engineering**: a) to build, to program and to command the created models; b) to be able to change the model's functions by modifying the mechanical system and/or adding sensors. **Maths:** a) calculation using numbers with one or two decimal places; b) time management in seconds and tenths of seconds; c) measurement in centimeters or inches; d) the use of numbers to create sounds, screenshots, distances, and other data. **Communication:** a) to be able to use the technology for creating and communicating ideas; b) to participate in the working-group in an active and positive-critical way; c) to be able to use visual elements to illustrate and represent the idea; d) to be able to write a logical sequence of events, as well as dialogues; e) to acquire technical vocabulary. **Social Competence:** teamwork, goal-orientation, problem solving and strategic thinking.

3. DAY - MINECRAFT

Minecraft is a free software used for creating 3D video-game.

The game allows players to build with a variety of different blocks in a 3D procedurally generated world, requiring creativity from players. Other activities in the game include exploration, resource gathering and crafting.

Multiple gameplay modes are available, including a survival mode in which the player must acquire resources to build the world and maintain health, a creative mode where players have unlimited resources to build with and the ability to fly, an adventure mode where players can play custom maps created by other players with certain restrictions, a spectator mode where players can freely move throughout a world without being allowed to destroy or build anything and be affected by gravity and collisions.

PROGRAMME	Learning Objectives
- Explanation of the activity - Minecraft approach - To know the Minecraft key-elements - Technological knowledge of Minecraft - Didactic approach of Minecraft - Minecraft in practice	Through this tool, pupils will develop the following Knowledge, Skills and Competences: **Science:** a) study and classification of materials; b) knowledge of the raw materials; c) the biosphere and the different habitats; d) different forms of energy; e) simple transformations of energy; f) environmental protection. **Artistic education:** a) the capability to create a creative solution to a planned problem on daily-life and/or school subjects; b) use of technological supports for artistic creations; c) application of basic knowledge of the interlinkage between colors. **Maths:** a) reading, interpreting, constructing and reproducing plans using scale models and maps; b) discovering the length, the perimeter, the surface and the volume; c) to learn the monetary system applying equivalences, operations and monetary changes; d) cartesian coordinate system; e) to know how time works (seconds, tenths of seconds); f) to know the fractions and percentages, as well as Sum, subtractions, multiplications, divisions; g) Cartesian coordinate system; h) use of softwares for creating geometric forms. **Communication:** a) develop the listening capability to reinforce pupils' comprehension in the scientific field; b) capability to communicate ideas and opinions in the working group; c) develop the capability to speak in front of other people to demonstrate their project idea; d) to acquire technical vocabulary. **Social Competence:** teamwork, goal-orientation, problem solving and strategic thinking.

4. DAY - VIDEOGAMES

The participants will learn how to use a platform for the development of video-games designed for educating children. The platform allows to use icons intuitively, so that children can design their own scenarios, characters and game dynamics. The creation of video games involves the use of

mathematics and aspects of physics that children will learn in an applicative and playful way. Thanks to the possibility to increase the level of complexity, children set their own objectives, making the game easier or more difficult. These video-games can be played online on the Web and open to everybody, even outside, as well as it can be played using different devices, such as tablets, phones or computers.

PROGRAMME	Learning objectives
- Introduction to the platform - Technological knowledge of the platform - Knowledge of the software - Video-game designing	**Science:** a) to discover gravity, velocities, energy transfer, friction, forces; b) to develop the ability to observe and investigate, as well as the capability to compare. **Technology:** a) to become able to program simple models; b) to be able to interpret 2D and 3D illustrations and models; c) to apply the principles of movement in physics and others; to develop the ability to manage digital and technological tools. **Engineering:** a) to generate ideas to find creative solutions. **Maths:** a) to use standard units; b) to be able to calculate also with decimals; c) to be able to estimate; d) to be able to use axles of coordinated; e) to be able to know and use positive, negative and random numbers; f) to be able to use numbers to create sounds, distances and other data. **Communication:** a) to describe a logical sequence of events to create a story; b) to be able to write dialogues between characters for the story; c) to acquire technical vocabulary. **Social Competence:** teamwork, goal-orientation, problem solving and strategic thinking.

5. DAY - CLOSING DAY

PROGRAMME	Learning Objectives
- Share ideas and debriefing - Sharing best experiences - Future project ideas - Course Evaluation - Delivery of the certifications	Let's share together our final thoughts and ideas about the course and possible future cooperation. During the previous days, participants will be busy to learn the new method. At the same time, it is important to share previous experiences and new ideas with the aim to create new potential cooperation. During the same day, participants will evaluate the course from different aspects and the final certificates will be delivered.