I love Neutrinos Summer exercises

Course: ILN001 2014-2015

Semester: 1

What is 'I Love Neutrinos'?

I Love Neutrinos is a private annual STEAM (Science, Technology, Engineering, Art & Math) course designed to enhance the capabilities of students through the development of projects using **Lego Mindstorms** as the technology platform.

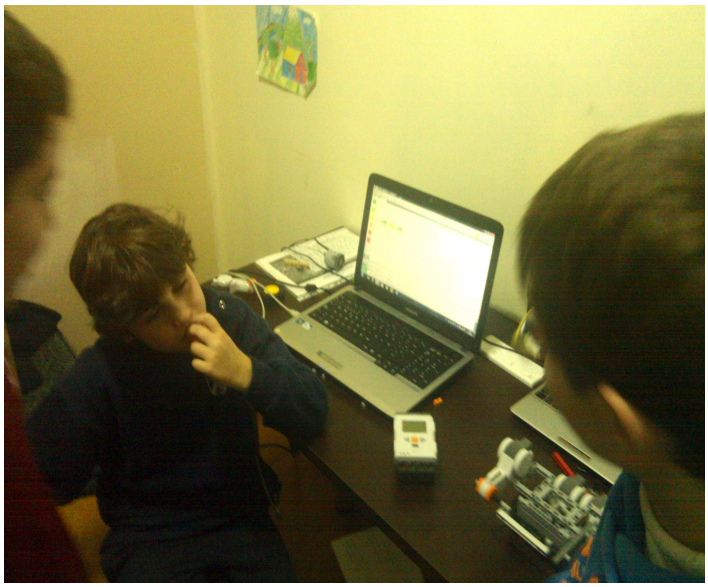

Illustration 1: Neutrinos discussing the best solution for a problem

The program tries to develop the idea about **Global citizens**. In the program, students participate in global contests as FIRST, Moonbots or Google Science Fair.

Besides, the program develop their own contests as **Esmartlz** and **Creatures**.

Why do you choose 'I Love Neutrinos'?

Classroom

The classroom has a limit number of students to maintain the quality of the educative experience. We think that ILN is a educative program, not a business oriented to courses. We try to find a balance between contents, problems and number of students.

Teachers

We only hire experts. Real experts are rare to find and maintain in teams. We believe in the finnish model. The best profesionals should teach next generations with the experience adquired in the industry.

Contents

Students only adquire real knowledge. Teachers have the mission to filter and develop right contents for the classes. In the course, students use the knowledge to participate in global contents and tests the learning process. In the development of the projects, students learn key values as: **Team building, Cooperation, Pressure points, Failure and achievement feelings**.

Personalized monitoring

Every student is different and their motivations. Teachers tries to mentor and guide to improve the educative process.

Spirit

We think in the **Excellence** concept and we transmit the value in the classrooms.

The list of issues always to be empty. Students have to find new challenges and not repeat the same exercises.

Annual schedule

- 2014
  - September
    - Family & Students welcome event
    - FLL Order
  - October
    - Class methodology
    - Programming Course
    - STEAM Course
  - November
    - Programming Course
    - STEAM Course
  - December
    - FLL
- 2015
  - January
    - FLL
  - February
    - FLL
  - March
    - FLL
    - FLL Contest
  - April
    - Creature project
    - STEAM Course
  - May

- Moonbots
- Google Science Fair

- June
  - The Great Ball Contraption
  - STEAM Course
  - Closing event

Alliances

http://www.devoxx4kids.org/

Summer exercises for Neutrinos

General

- What is your English Level?
  - http://www.cambridgeenglish.org/test-your-english/

Science

- What is the distance between The Earth to the moon?
- Can you explain the photosynthesis?
- Why ants and bees are considered as social insects?
  - What is a Organization?

Technology

- What is a LIDAR?
  - What is a Velodine LIDAR?
- Do you think that the usage of a Google Car is useful for you and your family?
  - Describe the advantages and disadvantages
- What is a simulator?
- Why a simulator is a critic piece in a space program?

Lego Mindstorms EV3

1. Develop a static arm with a grip
   1. Design the model in LDD
   2. Build the robot using the design

3. Develop a program to move a piece from the point one to point two.
    1. EV3 ideas
        1. https://www.youtube.com/watch?v=g5M-l2mLHvw
        2. https://www.youtube.com/watch?v=ozfXcvSCNNQ
    2. Real ideas:
        1. https://www.youtube.com/watch?v=OW4cYdsUpAw
        2. https://www.youtube.com/watch?v=LEgGqSybLTo
        3. https://www.youtube.com/watch?v=gt1k3BLN7pw
    4. Send LDD, Program and picture to the professor
2. Build a car which detect when you put something over.
    1. Design the model in LDD
    2. Build the robot using the design
    3. Develop a program to execute a route stop and detect when a user put a object over the robot then the robot continue the route.
    4. Send LDD, Program and picture to the professor
3. Use NXT-G maths calculus to create a program which sum 2 numbers and show the result in the display

Advanced exercises with EV3

- Install in a computer Linux Ubuntu
- Install LeJOS in a EV3
- Install Eclipse and Develop your first Java program

Engineering

- Why Formula one teams use wind tunnels?

- Research about Panama channel.
    - Imagine that you manage a MAERSK ship and you have to navigate from San diego to A Coruña. What is the best plan using Panama Channel? What is the distance? Imagine that you can't use Panama channel what is the alternative?
    - How many containers is it possible to transport in a MAERSK ship?
    - How many fuel liters use a MAERSK ship in that journey?
    - What options do you have if you want to transport by air?
        - What is the physical limit?
    - Is better to use transport the goods by sea or air?
        - What is your opinion?
- What is Operation research?
- What is high tension in energy term?
- In Spain, do we have a high tension network?
    - How we have energy at home?

Arts

- What is your favorite museum?
    - How many times per year do you visit a museum?
- Where is showed this painting?
    - Hint: NYC

Illustration 2: Paul Cézanne (French, 1839–1906) 1879-83

- What is your opinion about the paintings about George Brake?
  - What is the best painting from George Brake in your personal opinion?
  - What style did he use?
  - Do you know other artist who used the same style?

Maths

- Research about Maths used in the Keops pyramid in Egypt?
- What is Golden ratio?
- Did Greek use golden ratio in Parthenon?
- What is absolute value?
- What is the mean, median & mode?