



Physics Lesson Plan 2

Topic/Subject: Automated Pilot with ARDUINO. (6 h)

Target Group: 10

Objectives:

Obj.1. Modernizing the teaching of STEM subjects in high school.

Obj.2. Increasing teaching efficiency in teaching STEM subjects.

Obj.3. Cultivating students' interest in STEM subjects.

Obj.4. Justification of the device. Applications of this device.

Obj.5. Combining practical-experimental observations with the demonstration and definition of specific notions.

Obj.6. Proper use of equipment.

Approach/Methodology used:

Students select the equipment and components needed to make the device based on a scheme. In the first stage, combine the components to make the device (mechatronics). In the second stage, it makes the electrical connections between the ARDUINO board and the peripherals (electronics). In the third step, program the device.

Means/Tools/Educational technology

- 2 motors DC 3-6V
 - Arduino compatible UNO development board
 - Photo wiring prototype board 5x7 cm
 - Ultrasonic sensor module - HC-SR04 distance detector
 - H-Bridge L9110S for DC motor
 - Car with remote control (wheels)
 - 5000 mAh phone battery, 5V and 2A
- Ex. Calculators, Computers, the Internet, a spreadsheet (e.g Excel)

Plan for work

Time	Activities	Methods/ means
10 min	Theoretical approach to the problem	Projector/ board



ROBOSTEM Project

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20 min	Device configuration description.	Mechanical and electronic diagrams
20 min	Description of how to use the equipment used, such as: letcon, oscilloscope, etc	Mechanical, electronic and measuring and control equipment
100 min	Making the device	Work station
100 min	Device programming	Computer
30 min	Device testing step	Discussions with students
20 min	Device development possibilities	Discussions with students

Assessment/Feedback:

There was personal development and the acquisition of new knowledge by the teachers and students who participated in the program. Students renewed their interest in STEM subjects, mainly through laboratory exercises, and secondly from synthesis papers. Through practical training in laboratory STEM techniques, students gained self-confidence by increasing cooperation between them and strengthening their ability to work in a team, improving communication between teacher and students.

Bibliography:

1. ARDUINO pentru toți / <http://www.robofun.ro>
2. Îndrumător laborator microcontrolere ARDUINO / Sebastian Petru SABOU / U.T. PRESS CLUJ-NAPOCA, 2018 ISBN 978-606-737-341-7