Designing a microcontroller

Topic/Subject:

We organized lectures and workshops in four groups:

- Introduction to microcontrollers
- Microcontroller programming
- Application of microcontrollers – examples
- 'Do it yourself' - application of microcontrollers

Target Group:

Students from 1st to 4th grade, aged between 15 - 18.

Students are of different technical occupations:

- mechatronics,
- CNC operators,
- mechanical technicians and
- mechanical computer technicians.

Objectives:

Obj1. The increase in the level of educational digitalization
Obj2. Integrating the new technologies in the educational process
Obj3. Raising student motivation and awareness through usage of modern technology
Obj4. Integrating the new technologies in the educational process
Obj5. Encourage the application of new technologies in practical work environments.
Obj6. Boosting the development of STEM skills
Obj7. Increasing the students' skills for insertion on the labour market.

Approach/Methodology used:

dialogical,
learning to solve problems,
research,
simulation,
game,
project learning,
creative work,
change the place of learning

Means/Tools/Educational technology

Computers, the Internet, technical books, mobile phones, applications, IDE Arduino, Arduino uno, electrical components : LED lights, seven-segment digital display, electric motors, thermal sensors ...soldering iron, acid

Plan for work

Time	Activities	Methods/ means
March 2021.	**Introduction to microcontrollers** We covered a basic understanding of the arduino uno microcontroller, all its parts, and how we use them, and where microcontrollers are applied. Why we learn about microcontrollers.	dialogical research simulation Obj1 Obj3 Obj4 Obj7
June 2021.	**Microcontroller programming** In the Microcontroller Programming section, we taught them how to program electrical components, with logical commands in the arduino IDE software package. the electrical components we used are led lights, seven segment digital display, electric motors, thermal sensors ...	project learning, dialogical, research, simulation, Obj1. Obj2
October 2021.	**Application of microcontrollers – examples** We presented to them what the application of microcontrollers looks like for different areas of technical applications, and where a more complex device based on microcontroller technology would be applicable. We let the students try to recreate the presented examples of teachers on their own.	dialogical, game, project learning, change the place of learning Obj5. Obj3. Obj6.
December 2021.	**'Do it yourself' - application of microcontrollers** In this part, the students gave free rein to their imagination and devised their own applications of microcontrollers. Etching, drilling, soldering	learning to solve problems, research, simulation, game, project learning, creative work, change the place of

		learning Obj5. Obj6. Obj7

Assessment/Feedback:
The assessment was ultimately the design and presentation of their device. Each workshop conducted with students also accompanied the participants in their adoption and interest in the content of the workshop

Bibliography:

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