



„ Mobile Phone Solar Charger Project with Weather Report ”

The implementation of the project "**Mobility to improve teaching**", financed by the Erasmus + organization, started at the Technical High School in Cacak. The aim of the project is to modernize teaching and to develop the competences of teachers to carry out project teaching as a method of learning, in order to provide our students with as much functional knowledge as possible. We chose project teaching because it has not yet taken root in vocational high schools. Within this project, our students develop cross-curricular competences: problem solving, responsible attitude towards the environment, cooperation, communication, digital and working with data and information.

Teacher training meant observing project-based lessons with the implementation of good practice by a partner school in Velenje. The first part of the project was implemented through mobility to Slovenia, and the second part through the implementation seen in our post-mobility school practice.



The mobility lasted one week during which we were guests of the Velenje School Center. Upon returning from Velenje, the second phase of realization began, which was to introduce project teaching into our school practice by working with students of all 4 grades of the electrical course. The project team, together with the students, defined the name of the project - " The Project of Solar Cell Phone Charger with Outlook of Weather Conditions". After that, the subjects and teaching units within them (with the realization of which the project topic will be covered) were

identified. In this phase, the topics were: Biology, Electrical Engineering, Physics, English, Electronics 2 and Microcontrollers. The students were introduced the project and the way of working in which they could be very active: thinking, making decisions, researching, learning, discussing, collaborating, presenting, creating, using different sources of information ... We started from the first class with topics in biology, physics and electrical engineering with the theme SOLAR ENERGY. The topic was studied in different ways, by different subjects, from their own angles. The next stages of the project involved electronics, programming, 3D modeling and a concrete solar charger involving older students.



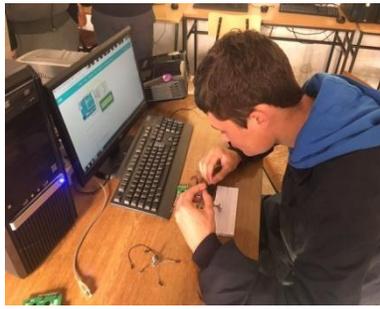
The subject of biology and professor Stanislava Maksimovic were assigned to cover the topic of solar energy through the field of "Sustainable development - concept". The professor realized the teaching units in the first grade class of electrical technician of electronics. Through the group work, the students researched, processed and presented the following: classification of natural resources, non-renewable natural resources, renewable natural resources, wind energy, water energy and the degree of utilization of renewable and non-renewable resources. They were especially concerned with the use of renewable energy, a solar power plant that exists in the Technical High School in Cacak. Three classes were completed..



During the practical work, Professor Goran Ćurčić, with the same students, covered the topic "DC Power Sources" through the group work of students with the task of studying batteries for photovoltaic panels, the principle of accumulating electricity as well as charging and discharging batteries.

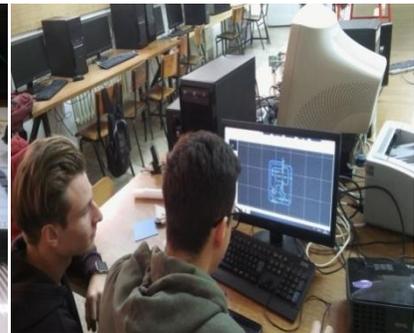


Professor of Physics, Danica Lukić, in the second grade class of electrical technician of electronics covered the topic Photoelectric effect and Einstein's equation of photoeffect with an emphasis on Photoeffect and principle of operation of photo-voltage panel.

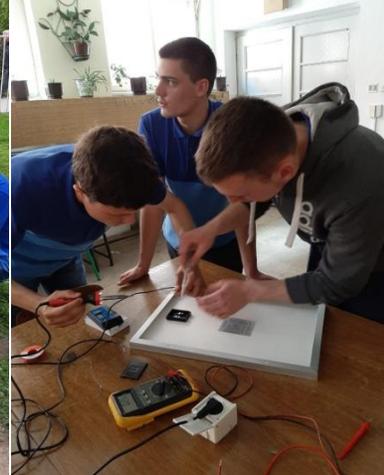
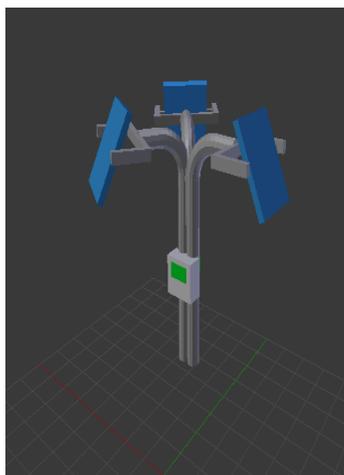


Professor Radenka Gavrilovic, in the subject of Electronics 2, in the third grade class of electrical technician of electronics, elaborated with the students the unit "Linear integrated circuits" in order to familiarize the students with the principle of operation of the voltage stabilizer and the acquired knowledge to realize the solar charger for a mobile phone within the defined project. In addition to the presentations and lectures they gave to their friends and also made models of simple circuits with a voltage stabilizer, which showed the working principle and which they will use in the exercises. They showed a video explaining to the attendees how the solar charger works.

In the third grade class, Professor Milun Jankovic, together with the students, worked on the unit "Solar Power" through group assignments to the students, with topics - How solar panels work, Charge controller, Gel Batteries and Maintenance of solar panels.



Professor Nikola Bošković and students of the fourth grade class of electrical technician of electronics and computer science, worked out the idea of practical design of part of the project, made a 3D model of solar charger of a mobile phone with the display of weather conditions, and started making a concrete Solar Charger, which will be installed in our school yard by the end of the project.



Our hardworking students, led by the young enthusiast Nikola Bošković, also studied the following topics:

- Introduction to the Arduino microcontroller,
- Analog and Digital inputs of the microcontroller,
- Registers for defining the operation of the microcontroller,
- A / D converter, input voltage attenuator,
- Connecting temperature, pressure, humidity sensors to the microcontroller,
- Connecting LCDs and displaying values,
- Writing code to measure and display desired values.

English teacher, Mirjana Vasiljevic with her students, within English classes, translated texts for the school website and required documents within the project activities.

The project and planned activities have been completed. Professional training was held at the Regional Centre in Cacak. Project and work products were presented, a photo exhibition was organized in the school hall, a solar charger was installed in the school yard and students were charging their phones with satisfaction.

