Co-funded by the Erasmus+ Programme of the European Union

Voltage meter with web output

Countries:	**Czech Republic**	**Slovakia**
Suitable for grade:	**3 - 4**	**3 - 4**
Specialization:	**IT**	**Technical lyceum, Electrotechnics**
Responsible teacher:	**Ladislav Opiol**	**Michal Copko**

Project description:
The goal is to construct at least four channels voltage meter for voltages 0-30V with possibility to send measured value through internet to the webserver. Voltage meter should have LCD display for local check of measured voltage and Arduino or other microcontroller with Ethernet module to send data through internet. Web application should have interface for starting new measurement, storing measured values and display them through web browser as table or graph (time based or XY-function).

Project tasks:
Student #1 (CZ):
- Design circuit for measuring of four different voltages in ranges 0-30V based on microcontroller
- Design PCB for microcontroller
- Prepare microcontroller program for sending measured values through internet to webserver and display measured values on LCD display
- Test the functionality of voltage meter and compare precision of constructed voltmeter with other voltage meteres with higher precision
- Write documentation bothin English and Czech language

Student #2 (SK):
- Prepare database for storing measurements and their values of four-channel voltage meter
- Prepare webserver and script for receiving data from voltage meter sent by internet
- Create web interface for management of measurements – create new measurement, display data, delete measurement
- Create script for display data in form of table or graph (time based or XY-function)
- Create script for recalculate values from volts (2-channels) to ampers if resistance value is known
- Write documentation bothin English and Slovak language

Success criteria:
Project will be successful after construction of working 4-channel voltage meter with desired precision based on microcontroller with local (LCD) and remote (web) output. Project should also follow safety rules according to working with voltage. All project parts should be cost efficient and software code should be well designed (time and memory efficient, without bugs). Project documentation has to be prepared based on given template in the range of 15-25 in English and native language.

Developed hard skills: Programming, debugging, making connectors and connections, electronic measurement, working with optoelectronic parts, working with datasheets, programming in C, programming with web languages, working with network protocols, computer graphics, computer networks, CAD systems, design of PCB, soldering
Developed soft skills: Cooperation, working with computer, planning, teamwork, tracking progress, communication in foreign language, responsibility, compliance with agreements, respect deadlines, problem solving, finding and processing information, design thinking, following safety and ergonomic rules