

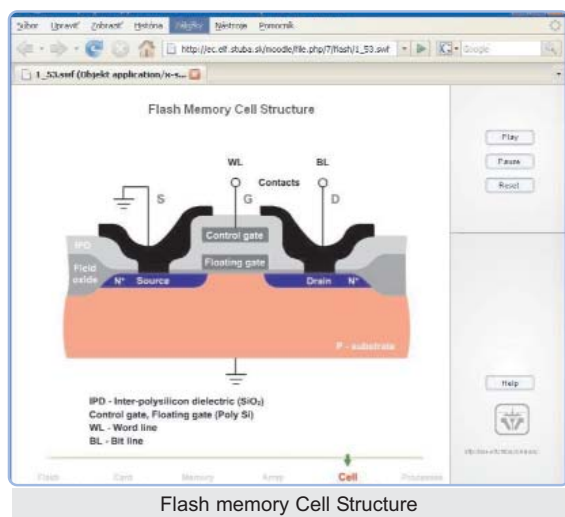
Interactive eLearning „Electronic Devices and Circuits”

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The potential of e-Learning as a new trend in education in this digital age is immense. The benefit of eLearning has inspired us to create an alternative source of information: **Interactive Course “Electronic devices and circuits”**. This course deals with the basic principle definitions and terms connected with electronic devices and circuits.

The course **“Electronic devices and circuits” in Slovak language is a free accessible eLearning project** on the „eLearn central” portal for students. This portal is located on the server of the Department of Microelectronics, Faculty of Electrical Engineering and Information Technology, Slovak University of Technology in Bratislava on the following link <http://www.kme.elf.stuba.sk/elearn/mdl/index.php>

The current version of this portal uses a course management system Moodle. The course “Electronic devices and circuits” includes **10 lessons, more than 35 interactive animations**, a glossary with **more than 300 terms** and number of hypertext references.



Our ambition was to help the students in understanding of inner processes in semiconductors and electronic circuits through interactive animations. Static pictures and characteristics do not support students' imagination of such inner processes very much. More than 30 interactive animations have been developed in Adobe Flash for this course. There are interactive animations of passive devices, passive filters, diodes and their usage in electronic circuits, as well as BT, HBT, JFET and IGBT transistors, real and ideal MOS structures, examples of planar technology produced diodes and bipolar junction transistor, digital circuits and gates are included. The lessons were converted into a widely approved eLearning standard SCORM package. The lessons have been supplemented by two types of interactive self testing modules and a glossary.

The course **“Electronic devices and circuits” is a result of collaboration of teachers and students from „eLearn central team”**. Complicated physical problems were solved by involving other teachers of our Department of microelectronics who specialise in given problems.

This course mainly serves for FEI students in the second year of their Bachelor study as an alternate source of information. Everyone who is interested in this topic can access this course, because the access to this course is free. The feedback from students and visitors was very positive and it helped us to improve our work.

At present, we are working on the English version of the course and animations, so that we can extend our cooperation with other teams working on similar problems.

This eLearning project got 7 awards in competitions on international eLearning conferences.

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Department of Multilayers and Nanostructures, Institute of Physics

The research group has expertise in the following areas (see: <http://www.fu.sav.sk/ml/General.html>):

- **fabrication and characterization** of thin films, granular films, multilayers and laterally patterned multilayers for X-ray optics and giant magnetoresistance effect applications, spin valve structures, ultra high vacuum electron beam deposition with in-situ ellipsometry control;
- **studies of surface and interface morphology** in thin films and multilayers by specular X-ray reflectometry, grazing incidence diffuse scattering and reciprocal space mapping, analysis of superlattice structures. The extended software package is available for simulation of experimental data. Magnetoresistance measurements at room temperature in magnetic field up to 1 T is performed; magnetization measurement of thin film samples by magneto-optical Kerr effect;
- **preparation of ordered 2-dimensional (monolayer) and 3-dimensional (artificial crystal, columns) arrays of colloidal nanoparticles** on common substrates, characterization of arrays by grazing incidence small angle X-ray scattering GISAXS, software for simulation of experimental data;

- **surface characterization techniques** with photoelectron spectroscopy, Auger electron spectroscopy, low energy electron diffraction, ellipsometry, AFM; experience with designing, building and characterizing of femtosecond high-power laser systems and extreme UV UHV beamlines.

- **spectroscopic techniques based on the measuring of a transient response to the potential step** (deep-level transient spectroscopy in both the temperature and rate-window scanning modes, capacitance-voltage measurements based on the feedback charge method, SPM and spectroscopy techniques) for nanostructure analysis and understanding of electronic phenomena in novel inorganic and organic materials and hybrid systems

- **electrochemistry** (cyclic voltammetry, steady-state voltammetry, kinetics sensitive voltammetry) for understanding of electrochemical phenomena in layered hybrid systems.

Information source: <http://www.fu.sav.sk>

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