





The Innovation of Physics Teacher Training at the Palacky University

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<http://www.upol.cz>

Physics and the educational programme

General educational programme - school educational programmes

- Secondary school – 6 hours - physics (1221 or 1212) in the modul Man and nature
- High school – 24 hours for the modul Man and nature (physics, chemistry, biology, geography, geology)



Curriculum reform

- **Greater knowledge of the science concepts**
- **Interdisciplinary relations**
- **Development of the pregraduate physics teacher educational programme at the university**



Key questions

- **What should be the role of the physics teacher today?**
- **What is the most effective way to prepare future physics teachers?**
- **How do we provide the very best science education for our students?**

Project– Qualitative Development of the Physics Teacher Programme



- **Physics, Techniques and Nature**
- **Simple Hands- on Experiments**
- **Environmental Physics**
- **Computer Based Experiments**

([http://
exfyz.upol.cz/oprlz](http://exfyz.upol.cz/oprlz))


Environmental physics

Basic problems studied by environmental physics can be pointed out:

- energy (based on thermodynamics – heat transfer, heat engine, renewable energy sources, reducing pollution),
- noise (acoustics),
- spectroscopy,
- transport of pollutants (transport physics, Navier-Stokes equation),
- greenhouse effect, weather and climate, physics of the atmosphere

High school physics

- **Mechanics of the point of mass and rigid body – movement of organism (inertia, friction, action and reaction – octopus)**
- **Gravitation field – Kepler laws – seasons, influence on the organism , wind erosion**
- **Molecular physics – diffusion, osmosis, thermodynamic laws – work, energy, heat, circle diagram, efficiency of heat engines**
- **Mechanical vibration and waves – energy of sea waves, noise**
- **Electric current – technical progress, economy of technical devices, electric pulse and heart motion**

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- **Magnetic field – our Earth is a huge magnet (solar wind protection)**
 - **Alternating current and electronics – influence of technics on the live and environment**
 - **Optics – interdisciplinary relations to biology, photosynthesis, ozone hole, greenhouse effect, black body radiation.**



Physics, nature, techniques

- **Lectures, seminars, laboratory experiments**
- **Thesis: energy (renewable resources), water (settlement, transport, energy, food, the physics, chemistry, biology of water etc.), air (climate), PC and technology(faster, smaller, smarter), electronics, noise, polymers, global warming.**



Non-traditional experiments

- **Simple experiments with plastic bottles, coins, syringes, candles**
- **Heuréka project**
- **Trade fair – science for the public**

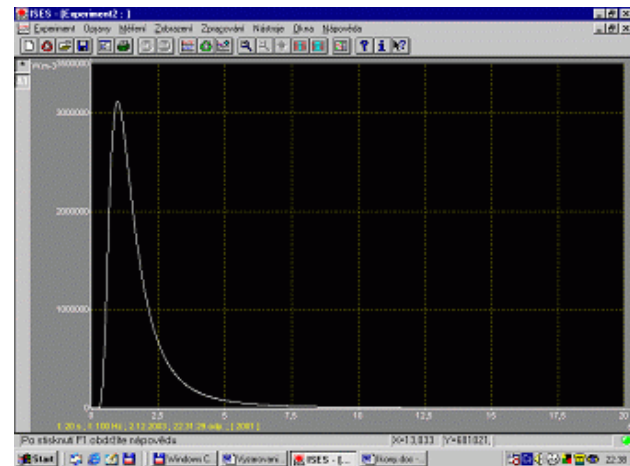
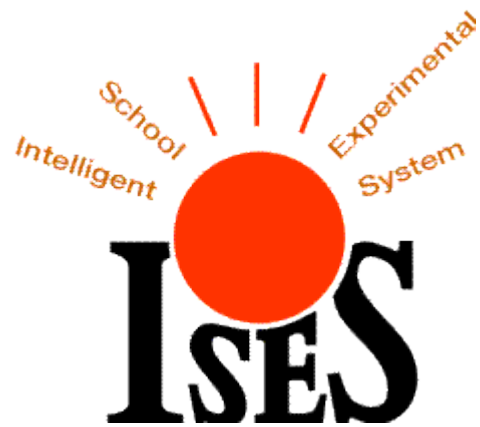


СЭНДЭГ БИЙЭ
УНДГА ВИСАА
МӨРИНЭ ШАДЦ
ТЭНДЭГ СЭЛЭ АНГА
ЭРВЭГ
АХУЙ
ЭНЭ ГЭЖИЙНЭ
БЭПЭЛ НЭЭРЭН
БЭЛЭГ АНЦ
ЭНЭГЭНЭ БИЙЭ
СЭЛЭН ТЭНЭГ
СЭНДЭГ АНГА



Computer based experiments





- **100 experiments – high school, university level**
- **interdisciplinary relations – EKG, heartbeat scanning**
- **state transition of soda thiosulfate**

IP Coach and ULAB



ULAB - easy to use, portable, graphic data collection system

Used in the classroom and in the field :

- as a versatile multimeter, for direct display of physical quantities measured by sensors connected to ULAB;**
- as a stand-alone datalogger for measurements independent of computer with real-time display of measured data on the ULAB screen;**
- as an interface connected to a PC computer with real-time display of measured data on the computer screen.**



Sensors

- Angle position sensor (0-240°), Accelerometer –5..5 g
- Barosensor, Blood pressure sensor
- CO₂ sensor, Colorimeter sensor
- Dissolved oxygen sensor
- ECG set
- Exercises heart rate sensor
- pH electrode
- Sound sensor
- Relative humidity sensor
- Temperature, termocouple
- Motion sensor
- Voltage
- Current
- Pressure
- Oxygen gas sensor
-

Physics for the public - The Physics, Chemistry and Mathematics Trade Fair

<http://ach.upol.cz/jarmark/>



Přírodovědecká fakulta UP v Olomouci pořádá

2006 Jarmark

chemie, fyziky a matematiky

KDY: 23. 6. 2006, 9 - 21 hod.
KDE: Horní náměstí v Olomouci



- * představení chemie, fyziky a matematiky zábavnou formou dětem i dospělým
- * autogramiáda ilustrátora nových učebnic Pavla Kantorka
- * soutěže a kvízy o hodnotné ceny
- * pokus o sestavení největšího modelu DNA v ČR
- * dobrá zábava pro všechny věkové kategorie

Jarmareční nabídka
stanovení tvrdosti vody • sudoku • stanovení methanolu ve Vaší slivovici • měření UV filtru ve Vašich brýlích • analýza Vaší vody • Bengálské ohně • létající plechovka • tajemství dědičnosti - DNA • laser a jeho použití • trocha astronomie • kouzelnické experimenty







More information about science and activities in the field of teaching, methodology and future trends in techniques and technology ...*media*

- **An “open university”**
 - the university opens its doors to the public
 - various activities for the young and old –
open house,
excursions,
presentations of successful research.

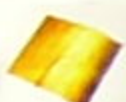
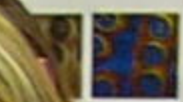






UNIVERSITY OF FRIEDLAND
TELESKOP
1994-2000

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Trade Fair of Ideas of Physics Teachers

<http://vnuf.upol.cz>







SCIENCE *on Stage 2*

Science teaching festival
Grenoble, France
2-6 April 2007

