

Open course on Modeling and Control of Multidisciplinary Systems in a Virtual Lab

at <http://virtual.cvut.cz/dynlabcourse/>



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Target groups:

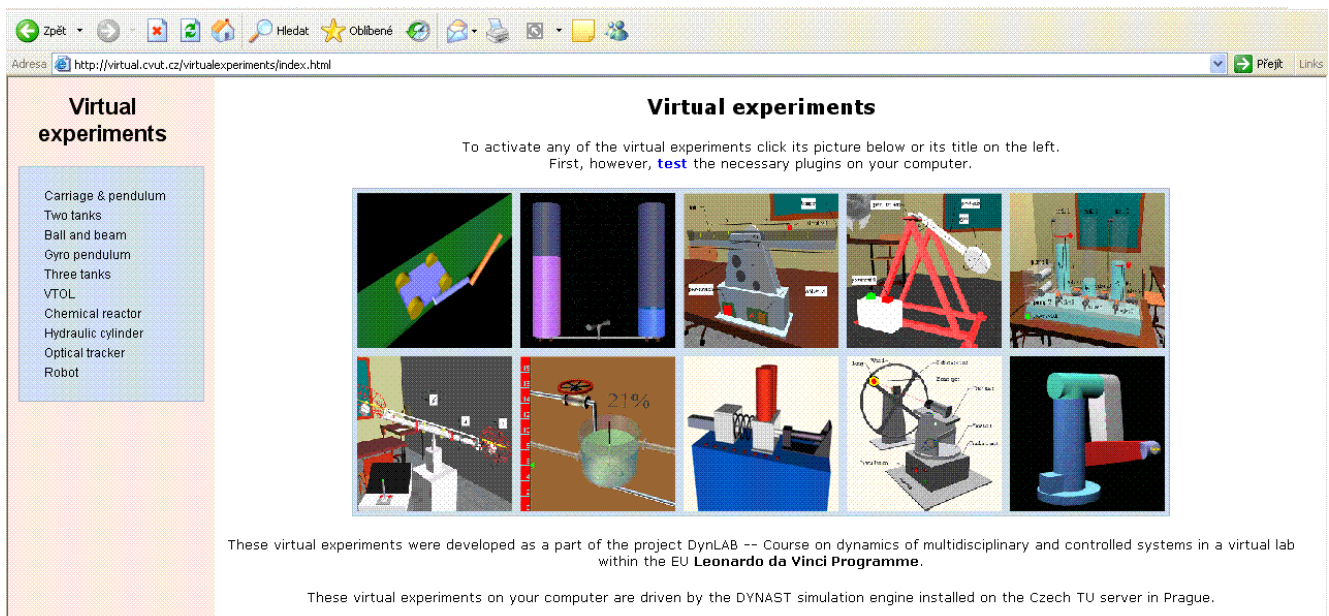
- students wishing to complement the traditional courses
- distance-education students at different levels of study
- practising engineers as a part of their life-long learning
- teachers intending to innovate the courses they teach

Key features:

- novel methodology for realistic modeling of multidisciplinary system dynamics in a unified, systematic and efficient way
- learners get a better 'feel' for the topic thanks to animated pictures, online simulation and online virtual experiments
- using the DYNAST software, learners can solve realistic problems without even being able to formulate equations, which stimulates their interest in dynamics before they are exposed to rigorous mathematics (see <http://dynast.net>)
- as the learners use the DYNAST Server, their tutors are able to monitor and correct their activities online
- to proceed through the course modules, learners can take individual paths tailor-made to their needs and background
- learners benefit from examples recorded during problem solving in academia and industry
- the course supports both self-study and remote tutoring combined with investigative and collaborative learning

Course outline:

Introduction to dynamics
Mechanical systems
Electrical systems
Fluid systems
Thermal systems
Magnetic systems
Electromechanical systems
Electronics of Semiconductors
Unified approach to modeling
Formulation of system equations
Formulation of transfer functions
The Laplace transform
Transfer functions
Frequency Response
Stability of linear control systems
The root-locus method
Behaviour of linear control systems
PID control and controller types
Compensator design methods
Control with complex loop structures
Design of state-feedback systems
Fuzzy systems
Fuzzy control
Nonlinear Control Systems



Virtual experiments

To activate any of the virtual experiments click its picture below or its title on the left.
First, however, **test** the necessary plugins on your computer.

Virtual experiments:

- Carriage & pendulum
- Two tanks
- Ball and beam
- Gyro pendulum
- Three tanks
- VTOL
- Chemical reactor
- Hydraulic cylinder
- Optical tracker
- Robot

These virtual experiments were developed as a part of the project DynLAB -- Course on dynamics of multidisciplinary and controlled systems in a virtual lab within the EU **Leonardo da Vinci Programme**.

These virtual experiments on your computer are driven by the DYNAST simulation engine installed on the Czech TU server in Prague.