

# **HYDRUS Short Course**

## **March 25 - 27 2019**

### **Program**

March 25, 2019

8:30 – 9:00	Short course participants' registration & introduction
9:00 - 12:30	HYDRUS short course
12:30 - 13:30	lunch
13:30 – 17:00	HYDRUS short course
18:00 – 21:00	Common dinner for all participants in the restaurant Švejk U Zeleného stromu <a href="http://www.uzelenehostromu.eu/en/">http://www.uzelenehostromu.eu/en/</a>

March 26, 2019

8:30 - 12:00	HYDRUS short course
12:00 - 13:00	lunch
13:00 – 17:00	HYDRUS short course

March 27, 2019

8:30 - 10:30	HYDRUS short course
10:30 – 12:30	HYDRUS short course, poster session, presentations by participants
12:30 - 13:30	lunch
13:30 - 15:30	HYDRUS short course
15:30 – 17:00	HYDRUS short course, poster session, presentations by participants

15 min coffee brakes are included in each morning and afternoon session.

# Advanced modeling of water flow and contaminant transport in porous media using the HYDRUS and HP1 software packages

## COURSE DETAILED OUTLINE

### Day 1:

- Lecture 1: Vadose zone flow and transport modeling: An overview.  
Lecture 2: The HYDRUS-1D software for simulating one-dimensional variably-saturated water flow and solute transport.
- Computer session 1: HYDRUS-1D: Infiltration of water into a one-dimensional soil profile.
- Lecture 3: On the characterization and measurement of the hydraulic properties of unsaturated porous media.
- Lecture 4: Application of the finite element method to variably-saturated water flow and solute transport.
- Computer session 2: HYDRUS-1D: Water flow and solute transport in a layered soil profile.
- Lecture 5: Inverse modeling; application of HYDRUS-1D to laboratory and field experiments.
- Computer session 3: HYDRUS-1D: One- or multi-step outflow experiment.

### Day 2:

- Lecture 6a: Application of the finite element method to 2D variably-saturated water flow and solute transport.
- Lecture 6b: HYDRUS (2D/3D) software for simulating two- and three-dimensional variably-saturated water flow and solute transport.
- Computer session 4: HYDRUS (2D/3D): Subsurface line source.
- Computer session 5: HYDRUS (2D/3D): Furrow infiltration with a solute pulse.
- Computer session 6: HYDRUS (2D/3D): Flow and transport in a transect to a stream.
- Computer session 7: HYDRUS (2D/3D): Three-Dimensional Water Flow and Solute Transport.

### Day 3:

- Lecture 7: Preferential and Nonequilibrium Flow and Transport.
- Computer session 8: HYDRUS-1D: Nonequilibrium Flow and Transport.
- Lecture 8: Coupled movement of water, vapor, and energy.
- Computer session 9: HYDRUS-1D: Coupled movement of water, vapor, and energy.
- Lecture 9: Multicomponent biogeochemical transport modeling using the HYDRUS computer software packages; Introduction to the HP1 code, which was obtained by coupling HYDRUS-1D with the PHREEQC biogeochemical code.
- Computer session 10: Applications of HP1 to simple solute transport problems involving cation exchange and precipitation/dissolution of minerals.
- General session: Other applications and future plans in HYDRUS development.