HYDRUS Short Course
March 23 - 25 2020

Program

Monday: March 23, 2020

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

Tuesday: March 24, 2020

8:30 - 12:00	HYDRUS short course
12:00 - 13:00	lunch
13:00 – 17:00	HYDRUS short course
18:00 – 21:00	Common dinner for all participants in the restaurant Švejk U Zeleného stromu http://www.uzelenehostromu.eu/en/ (or TBA)

Wednesday: March 25, 2020

8:30 - 12:00	HYDRUS short course
12:00 - 13:00	lunch
13:00 - 14:30	HYDRUS short course

15 min coffee breaks are scheduled within each morning and afternoon session.

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

DETAILED COURSE 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- and multi-step outflow experiments.

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:	Overview of multicomponent biogeochemical transport modeling using the HYDRUS computer software packages, e.g., with the UNSATCHEM, HP1, and Wetland Modules.
Computer session 10:	HYDRUS-1D: Modeling Salinity with H1D.
Computer session 11:	UNSATCHEM: Modeling Salinity with UNSATCHEM.
General session:	Other applications and future plans with HYDRUS.

HPx (HYDRUS/PHREEQC) Short Course
March 26 - 27 2020

Program

Thursday: March 26, 2020

8:30 – 9:00	Short course participants' registration & introduction
9:00 - 12:30	HYDRUS/HP1 short course
12:30 - 13:30	lunch
13:30 – 17:00	HYDRUS/HP1 short course
18:00 – 21:00	Common dinner for all participants in the restaurant U Glaubiců http://www.restaurantuglaubicu.cz/ (or TBA)

Friday: March 27, 2020

8:30 - 12:00	HYDRUS/HP1 short course
12:00 - 13:00	lunch
13:00 – 16:00	HYDRUS/HP1 short course

15 min coffee breaks are scheduled within each morning and afternoon session.

Advanced modeling of water flow and biogeochemical transport in porous media using the HPx software packages

DETAILED COURSE OUTLINE

Day 1:

Lecture 1:	Biogeochemical equilibrium modeling
Computer session 1:	Introduction of PHREEQC
Computer session 2:	Definition of initial solutions
Computer session 3:	Examples of reaction path modeling
Lecture 2:	Reactive transport in the vadose zone: Examples and approach
Computer session 4:	Setting up a HPx project – Mineral dissolution/precipitation waves

Day 2:

Lecture 3:	Surface-related processes: ion exchange and surface complexation
Computer session 5:	Ion exchange in PHREEQC
Computer session 6:	Chromatographic transport of major cations and heavy metals
Computer session 7:	Surface complexation models for U speciation
Lecture 4:	Kinetics
Computer session 8:	Writing kinetic rate equations
Computer session 9:	First-order kinetic PCE degradation network