Training Course: Flow Simulation Using HEC-RAS 5.0

Date: July 13-14th, 2015
Time: 8:00 AM - 5:00 PM
Location: University of Arizona Campus, Tucson, AZ 85721

Cost: $600

Instructor: Jennifer G. Duan, PhD, PE, D.WRE, M.ASCE, Delbert Lewis Distinguished Professor, Department of Civil Engineering and Engineering Mechanics, University of Arizona.
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Course Description

This two-day intensive training course aims to prepare engineers, water resource professionals, and policy makers to use the newly added two-dimensional (2D) unsteady flow simulation tool in HEC-RAS model. Participants are expected to learn the fundamentals of 2D model, get hands-on tutoring on how to use the 2D module in HEC-RAS, practice on how to add 2D flow to an existing 1D HEC-RAS model, and develop graphic displays or animation of the simulation results. Besides examples provided in HEC-RAS model, examples of Arizona water course will be used as a part of the training material.

The course is divided into four sections. The description of each section is summarized below:

Section 1: Fundamentals of 2D flow model: the shallow water equations (SWE), the basic principles of finite volume method for solving SWE, cell-centered finite volume method.

Section 2: 2D computational grid in HEC-RAS: the principles of 2D computational grid in HEC-RAS, steps to develop the terrain model through RAS Mapper, generate 2D grid, connect 2D grid with 1D grid, and assign properties to grid cells.

Section 3: Simulation using 2D Model: boundary conditions of 2D model, internal boundary conditions connecting 1D and 2D models, modeling parameters (e.g., time step, convergence criteria), unsteady flow model runs, stability, and debugging.

Section 4: Post-processing of modeling results: interpretation of modeling results, data export, visualization, graphic displays, animations, and sensitivity of modeling results.

The course will focus on hand-on training on how to use HEC-RAS 2D modeling tool. Section 1 gives the participants an overview of basic 2D modeling principles, Section 2 and 3 are the steps

essential for building up HEC-RAS 2D model, and Section 4 is for reporting the simulation results. Comparisons of the methods in HEC-RAS 2D model and other models (e.g., Flo-2D, HEC-HMS) will be discussed.

The course will be taught at a multi-media computer classroom at the University of Arizona campus. Each participant will have a computer pre-installed with the course material. To ensure participants keep up with the course, several teaching assistants will be available throughout the course.

Tentative Schedule

Day 1		**Day 2**	
8:30-10:00 am	Section 1 - fundamentals	8:30-10:00 am	Section 3 - boundary conditions
10:00-10:30 am	Break	10:00-10:30 am	Break
10:30-12:00 am	Section 2 - create terrain model	10:30-12:00 am	Section 3 - connect 1D/2D model
12:00-1:00 pm	Lunch break	12:00-1:00 pm	Lunch break
1:00-3:00 pm	Section 2 - create 2D grid	1:00-3:00 pm	Section 3 - model runs, debug
3:00-3:30 pm	Break	3:00-3:30 pm	Break
3:30-5:00 pm	Section 2- assign grid property	3:30-5:00 pm	Section 4 - post-processing

Course Material

Participants are expected to receive a CD that contains the latest HEC-RAS 5.0 software, HEC-RAS User's Manual, HEC-RAS Hydraulic Reference Manual, HEC-RAS Example Problems, and Course Material and Additional Example Problems.

Accommodation

Breakfast, coffee break, and boxed lunch will be provided daily at the building's courtyard. For non-local participants, Tucson Marriott Hotel at University Park is conveniently located on campus. The hotel address is 880 East Second Street, Tucson, Arizona 85719. Telephone: 1-520-792-4100.

Biography of Instructor: Dr. Jennifer G Duan is an Associate Professor at the Department of Civil Engineering and Engineering Mechanics, the University of Arizona. She is also an active registered Professional Engineer in the State of Arizona. She is an international renowned leader is developing two-dimensional hydrodynamic model for simulating unsteady flow and sediment transport processes in riverine environment. She has published over 50 papers in peer-reviewed international journals in the area of computational modeling of flow and sediment transport processes. Selected publications can be found at www.hydrosed.com. She has many years of teaching experience in open channel flow and computational hydraulics. To accommodate this short course, her research team has developed example cases originated from real engineering projects in the State of Arizona.