



The Environmental Professional Program
Portland State University



Portland
State
UNIVERSITY

EPP 501 – Hydraulics Analysis using HEC-RAS 2D*

Course Summary: This intensive 3-day workshop will instruct students on the use of HEC-RAS for two-dimensional hydraulic modeling. The course will include an overview of 2-D flow theory, RAS Mapper, and the differences between 1-D and 2-D modeling. The use of the model is taught through hands-on exercises and real-world project examples. Students should have an existing working knowledge of HEC-RAS.

The seminar includes lectures on 2D flow theory, an introduction to the new capabilities and features of HEC-RAS and RAS Mapper, and procedures for creating a stable and calibrated 2D model. Workshops focus on giving students hands on experience with building and pre-processing the computational mesh, performing offline and inline 2D projects, and using the built-in feature RAS Mapper to spatially analyze results.

The HEC-RAS modeling system was developed as part of the Corps of Engineers Hydrologic Engineering Center Next Generation software and replaces several existing programs including HEC-2, UNET, and HEC-6. HEC-RAS incorporates various aspects of 2D hydraulic modeling, including flow and water surface profile and computations within storage areas, and the interaction between 1D and 2D systems. Version 6.4.1 of HEC-RAS includes features in 2D open channel hydraulic analysis such as:

- Two-dimensional flow analysis using the full Shallow Water Equations or Diffusion Wave equations in 2D.
- Ability to perform a combination of 1D and 2D flow analysis in the same model.
- The use of unstructured or structured computational meshes for the 2D flow areas.
- 2D Bridges
- Spatial Precipitation (i.e. Rain on Grid)
- Turbulence and Wind

HEC-RAS is user friendly, computationally efficient, and runs within, and fully supports the Microsoft Windows environment. It uses the latest graphical user interface (GUI) technology for data entry, graphics, and display of program results. Complete context-sensitive help screens are available for every program feature and option. Software includes the following functions: file management, data entry and editing, hydraulic analyses, tabulation and graphical displays of input and output data, reporting facilities, and on-line help.

Seminar Benefits/Learning Outcomes

- Learn how to use the U.S. Army Corps of Engineers HEC-RAS (River Analysis System) computer program to model two-dimensional unsteady flow hydraulics.
- Get an overview of two-dimensional flow theory and the differences between one-dimensional modeling.
- Gain hands-on HEC-RAS experience by participating in practical computer workshops.
- Understand how to develop a stable and calibrated two-dimensional flow model.
- Obtain valuable insights in methods for minimizing computation errors and instabilities for two-dimensional unsteady hydraulic models.
- Learn from real world projects and applications.

Who Should Attend

Consulting engineers, water resource planners, engineers employed by local, state, or federal government agencies. Participants should have some experience in floodplain hydrology and hydraulics, and sound experience in HEC-RAS steady and unsteady flow computer modeling. They should also be able to follow simple computer instructions.

Duration: Three day in-person course

Available Professional Credit: 2.4 CEU, 24 PDH.