

Agenda

Presented by Gregory H. Nail, PhD. PE

Introductions and One Dimensional Steady Flow HEC-RAS Review

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|--|-----------------------------------|
| Introduction and overview | Basic definitions and assumptions |
| Conservation of energy and energy losses | Computational enhancements |

Unsteady One-Dimensional Open Channel Hydraulics Background and Theory

- | | |
|---------------------------------|-------------------------|
| Basic assumptions | Conservation of mass |
| Conservation of momentum | Computational algorithm |
| Boundary and initial conditions | |

Two-Dimensional Open Channel Hydraulics Background and Theory

- | | |
|----------------------------------|-------------------------------------|
| Basic assumptions | Conservation of mass |
| Conservation of momentum | Boundary and initial conditions |
| Computational mesh and algorithm | HEC-RAS and historical perspectives |

Demonstration 1 – Building an Unsteady 1D HEC-RAS Model without GIS

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|--|--|
| HEC-RAS user interface | Generating the geometry |
| Generating the boundary and initial conditions | |
| Initial conditions | Unsteady flow computational simulation |
| Viewing of results | |

Demonstration 2 - GIS Basics

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|--|--------------------------|
| Introduction and overview | |
| Geographic versus projected coordinate systems | |
| Raster versus vector files | ArcMap versus ArcCatalog |
| ArcMap interface basics | Digital elevation model |
| Other files | |

Demonstration 3 – Building an Unsteady 1D HEC-RAS Model with GIS

- RASMapper interface and the projection file
- Digital elevation models and geometry creation
- Generating the boundary and initial conditions
- Unsteady flow computational simulation
- Display and interpretation of results

Demonstration 4 – Building a Basic 2D HEC-RAS Model

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|--|---------------------------------------|
| RASMapper interface and 2D geometry | |
| 2D mesh generation | 2D boundary and initial conditions |
| Other miscellaneous computational parameters | |
| 2D computational simulation | Display and interpretation of results |

Demonstration 5 – 2D HEC-RAS Model with Connections

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|---|----------------------------------|
| RASMapper interface and mesh generation | |
| Spatially varied Manning's n | Connections |
| 2D computational simulation | Viewing and interpreting results |

Demonstration 6 – 1D/2D HEC-RAS Model and Other Considerations

- | | |
|--|---|
| RASMapper interface and combined 1D/2D mesh generation | |
| Manning's n and connections | External 2D flow area boundary conditions |
| Other miscellaneous computational parameters | |
| 1D/2D computational simulation | Viewing and interpreting result |

Advanced HEC-RAS Modeling

Live, Interactive Webinar - Friday, July 22, 2022

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Learning Objectives

You'll be able to:

Discuss the principles of open channel hydraulics that underlie one-dimensional and two-dimensional modeling with HEC-RAS software.

Learn about building an unsteady one-dimensional HEC-RAS model with and without GIS.

Discuss GIS basics for use in HEC-RAS modeling.

Explore the process of building a basic two-dimensional HEC-RAS model.

Get tips on using the RASMapper interface, and discuss mesh generation.

Create HEC-RAS models with connections, and view and interpret modeling results.

HalfMoon Education Live Webinars

Advanced HEC-RAS Modeling

Live, Interactive Webinar - Friday, July 22, 2022



Explore the hydraulic science behind USACE's HEC-RAS software

Discuss unsteady one-dimensional open channel hydraulics

Examine two-dimensional open channel hydraulics

Watch demonstrations of unsteady 1D HEC-RAS models built with and without GIS

Get demonstrations of basic 2D HEC-RAS models

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7.0 HSW CE Hours
7.0 LA CES HSW PDHs

Floodplain Managers
7.0 ASFPD CECs

Geologists
7.0 PDHs/CE Hours



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Faculty

Gregory H. Nail, PhD. PE
Associate Professor, University of Tennessee at Martin
Dr. Nail is an associate professor in the Engineering Department at the University of Tennessee at Martin where he teaches a variety of courses including fluid mechanics, hydraulics and hydrology, and hydraulic and hydrologic modeling. He holds a professional engineer’s license based on having passed both the Civil and Mechanical discipline-specific exams. Prior to coming to UT-Martin in 2002 he worked as a research hydraulic engineer for the United States Army Corp of Engineers for 11 years. He is a former member of the Executive Committee of the Tennessee American Water Resources Association, and he has lectured on various HEC-RAS modeling topics at the Annual Tennessee Water Resources Symposium and at other venues. Dr. Nail earned his B.M.E. degree from Auburn University and his M.S. and Ph.D. degrees from Texas A&M University.

Webinar Information

Log into Webinar 8:00 - 8:30 am CDT	Break 11:55 am - 12:25 pm CDT
Morning Session 8:30 - 11:55 am CDT	Afternoon Session 12:25 - 4:20 pm CDT

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- The Art of Retracement for Surveyors**
- Wed, June 22, 2022 | 8:30 am - 4:00 pm CDT
- Mature Tree Management**
- Wed, June 22, 2022 | 9:00 am - 11:00 am CDT
- Easements and Rights-of-Way**
- Thurs, June 23, 2022 | 8:30 am - 4:00 pm CDT
- Slope Stabilization and Landslide Prevention**
- Thurs, June 23, 2022 | 8:30 am - 3:30 pm CDT
- Drones in Construction**
- Fri, June 24, 2022 | 9:30 am - 4:50 pm CDT
- The Urban Forest: Challenges and Opportunities**
- Fri, June 24, 2022 | 9:00 am - 4:30 pm CDT
- Creating a HEC-RAS Model**
- Tues, June 28, 2022 | 8:30 am - 4:00 pm CDT
- Pedestrian and Bicycle Transportation Planning and Design**
- Wed, June 29, 2022 | 9:00 am - 3:50 pm CDT
- AIA Contract Document Workshop**
- Wed, July 6, 2022 | 8:30 am - 4:30 pm CDT
- Restoring Natural Areas in Urban Areas**
- Wed, July 6, 2022 | 9:00 am - 4:50 pm CDT
- How to Design Foundations for Expansive Soils**
- Fri, July 8, 2022 | 1:00 - 4:15 pm CDT

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