

Agenda

Presented by Gregory H. Nail, PhD, PE

Introductions and Exploring Open Channel Hydraulics

Introduction and overview Exploring open channel hydraulics

Steady One-Dimensional Open Channel Hydraulics Background and Theory

Conservation of energy: steady one-dimensional
Conservation of momentum
Conservation of energy: energy losses
Conservation of energy: computational enhancements
Bernoulli's equation Computer based analysis and computations

HEC-RAS and Water Surface Profiling

Required data and boundary conditions
Backwater and forewater calculations Bridge and culvert modeling

History and Development of HEC-RAS

Demonstration 1 – Building a HEC-RAS Model without GIS

HEC-RAS user interface
Building a hydraulic model without geo-referenced data
Steady flow computational simulation Viewing of results
Trapezoidal channel example

Demonstration 2 - GIS Basics

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 a HEC-RAS Model with GIS

RASMapper interface and the projection file
Digital elevation models and geometry creation
Building a hydraulic model with geo-referenced data
Steady flow computational simulation
Display and interpretation of results

Demonstration 4 – Typical HEC-RAS River Reach and Mixed Flow

Subcritical flow Mixed flow

Demonstration 5 – Typical HEC-RAS Bridge Model

Cross section locations Expansion and contraction coefficients
Implementing the bridge Steady flow simulation
Viewing and interpreting results

Demonstration 6 – Typical HEC-RAS Culvert Model

Cross section locations Implementing the culvert
Steady flow simulation Viewing and interpreting results

Demonstration 7 – Typical HEC-RAS Encroachment Model

Encroachment methods
Steady flow simulation
Viewing and interpreting results

Introduction to HEC-RAS Modeling
Live, Interactive Webinar - Thurs., December 10, 2020

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Learning Objectives

You'll be able to:

Explain the history and development of HEC-RAS software.

Discuss steady one-dimensional open channel hydraulics.

Build a hydraulic model with and without geo-referenced data.

Discuss GIS basics.

Watch a demonstration of HEC-RAS river reach and mixed flow.

View and interpret results of typical HEC-RAS models for bridges and culverts.



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Introduction to HEC-RAS Modeling

Live, Interactive Webinar - Thursday, December 10, 2020



Understand steady one-dimensional open channel hydraulics

Explore HEC-RAS and water surface profiling

Review GIS basics

Discuss building HEC-RAS models with and without geo-referenced data

Explore typical HEC-RAS models, including river reach, bridges, culverts, and encroachment.

Continuing Education Credits

Professional Engineers
7.5 PDHs

Floodplain Managers
7.5 CECs



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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 CST	Break 12:15 - 12:45 pm CST
Morning Session 8:30 am - 12:15 pm CST	Afternoon Session 12:45 - 5:00 pm CST

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- Introduction to HEC-HMS Modeling**
- Mon., Nov. 23, 2020 | 8:30 am - 4:00 pm CST
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- Construction Project Management**
- Mon., Nov. 23, 2020 | 11:00 am - 3:15 pm CST
- ALTA Standards, Public Land Survey Systems and Other Must-See-Matters**
- Mon., Nov. 30, 2020 | 11:00 am - 2:30 pm CST
- Tues., December 1, 2020 | 11:00 am - 2:30 pm CS
- GNSS Surveying: Principles and Practices**
- Wed., December 2, 2020 | 9:30 am - 5:00 pm CST
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- Thurs., December 3, 2020 | 11:00 am - 2:30 pm CST
- Pruniversity: Plant Health Through Pruning**
- Thurs., December 3, 2020 | 9:00 am – 5:00 pm CST
- 2018 International Existing Building Code: Work Area Compliance Method**
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Introduction to HEC-RAS Modeling

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