

## General Information

### Workshop Technical Level

The HEC-RAS 2-D computer workshop is intended for the moderately experienced HEC-RAS users. The course uses a mixture of lecture and hands-on computer workshops. A general understanding of HEC-RAS and unsteady flow modeling is preferable to get the most out of this course.

### Course Fees

- \$650 for the 3-day workshop.

### Class Size

Class size will be limited to 28 participants.

### Course Location



GateWay Community College  
108 N. 40th Street  
Phoenix, AZ 85034  
Classroom SO 1201

### Hotel Accommodations

AFMA has not made any special arrangements for accommodations; however, there are numerous hotels in the vicinity. For hotel information contact Julie Cox (602) 506-8401 or [jrc@mail.maricopa.gov](mailto:jrc@mail.maricopa.gov).

### Registration

Please visit [www.azfma.org](http://www.azfma.org) and register under the events calendar.

### Cancellation Policy

- Cancellation 3 weeks prior to course, will receive a full refund.
- Cancellation 2 weeks prior to course, will receive 50% refund.
- Cancellation 1 week prior to course, will not receive a refund.
- AFMA will allow substitutions.

### Workshop participants will receive:

- Course Notes and Workshop Problems
- 12 ASFPM Pre-Approved Continuing Education Credits

### Questions

Contact Cindy DePonti  
Office: 602.294.2246  
Email: [cdeponti@mbakerintl.com](mailto:cdeponti@mbakerintl.com)

AFMA  
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## HEC-RAS 2-D

Computer Workshop

Sponsored by:



Arizona Floodplain  
Management Association  
[www.azfma.org](http://www.azfma.org)



GateWay Community College  
108 N. 40th Street, Phoenix, AZ 85034  
<http://www.gatewaycc.edu>

Phoenix, Arizona  
June 9-11, 2015

# HEC-RAS 2-D Computer Workshop

## Objectives

The Army Corps of Engineers Hydrologic Engineering Center's Hydrologic River Analysis System (HEC-RAS) has been updated to include two dimensional modeling capabilities. This class will introduce the experienced HEC-RAS users to these new 2-D capabilities.

Through attending this workshop, participants will:

- ✓ 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.

## About WEST Consultants, Inc.

WEST is a firm with national and international experience providing technical training courses in water resources. WEST provides water resources engineering consulting services to governmental and private clients on a local, national and international level from our offices in Tempe, Arizona; San Diego and Folsom, California; Salem and Portland, Oregon; and Bellevue and Vancouver, Washington.

In the course of the different projects and studies that we perform for clients, use of numerical models is an everyday activity at WEST. We have many different models in our toolbox and familiarity with the strengths and weaknesses of each allows us to select the appropriate modeling tool for any given situation. WEST personnel are able to run a spectrum of different models ranging from one-

three-dimensional and from hydrologic to hydraulic to sediment transport and water quality. However, the models that we employ most often are the HEC suite of models. Because of our experience in use of these models, we are able to offer effective training in how to apply them correctly.

WEST's expertise using these models is reflected in the Hydrology and Hydraulics contracts that the company has been awarded from multiple districts of the U.S. Army Corps of Engineers, as well as the Hydrologic Engineering Center (HEC). WEST's experience is also recognized by the American Society of Civil Engineers, who has trusted WEST to teach hydraulic modeling and streambank protection courses for them over the past 20 years.



Day 1	
8:00 - 8:30 AM	Introductions and Administration
8:30 - 9:45 AM	Lecture: Introduction to 2D Modeling in HEC-RAS
9:45 - 10:00 AM	Break
10:00 - 10:45 AM	Lecture: HEC-RAS Unsteady Flow Review
10:45 - 11:45 AM	Workshop and Review: Lateral Structures and Storage Areas
11:45AM - 12:45PM	Lunch
12:45 - 1:45 PM	Workshop and Review: Lateral Structures and Storage Areas (Cont.)
1:45 - 3:00 PM	Lecture: 2D Theory
3:00 - 3:15 PM	Break
3:15 - 4:15 PM	Lecture: RAS Mapper
4:15 - 5:00 PM	Lecture: Creating 2D Areas
Day 2	
8:00 - 8:30 AM	Lecture: Creating 2D Areas (Cont.)
8:30 - 10:30 AM	Workshop and Review: Adding a 2D Flow Area
10:30 - 10:45 AM	Break
10:45 - 11:45 AM	Lecture: Viewing 2D Output and Results
11:45AM - 12:45PM	Lunch
12:45 - 2:45 PM	Workshop and Review: Offline 2D Area
2:45 - 3:00 PM	Break
3:00 - 4:00 PM	Lecture: 1D vs 2D Modeling
4:00 - 5:00 PM	Workshop and Review: Inline 2D Area

## Instructors

Day 3	
8:00 - 10:00AM	Workshop and Review: Inline 2D Project (Cont.)
10:00 - 10:15 AM	Break
10:15 - 11:15 AM	Lecture: Troubleshooting and Reviewing 2D Models
11:15AM - 12:00PM	Workshop and Review: Troubleshooting
12:00 - 1:00 PM	Lunch
1:00 - 2:45 PM	Workshop and Review: Troubleshooting (Cont.)
2:45 - 3:00 PM	Break
3:00 - 4:00 PM	Lecture 2D Model Calibration
4:00 - 5:00 PM	Summary, Review, and Closure

WEST may replace instructors as schedule permits\*

The instructors for this course will be:

Brian Wahlin, Ph.D., P.E., D.WRE, Brian received his Ph.D. in civil engineering from Arizona State University and has more than 20 years of hydraulic engineering experience. He has extensive experience in unsteady flow applications and statistical and uncertainty analysis. Brian is one of WEST's lead instructors for various courses taught for ASCE.

Christopher Goodell, P.E., D.WRE, Chris is a senior hydraulic engineer with WEST and has more than 20 years of experience in computational hydraulics, river hydraulics and hydraulic design. He spent two years at HEC actively working on the development of HEC-RAS. Chris is a contributing author to the HEC-RAS manuals and has applied HEC-RAS to a wide range of complex problems, including dam breaks, bridge and culvert hydraulics, spillway and outlet works design, stable channel design, and floodplain mapping. Mr. Goodell has taught HEC-RAS courses and provided technical support for HEC-RAS since 2000.

Martin J. Teal, P.E., P.H., D.WRE, Marty has worked with hydraulic and hydrologic models for more than 25 years and is currently a Vice President with WEST. His experience includes working as a hydraulic engineer for the U.S. Army Corps of Engineers and as a civil engineer for a large multinational firm in Chile. While with WEST, he has dealt with complex hydraulic, hydrologic, and sedimentation problems and applied numerical models for analysis and design. He has taught HEC-RAS, HEC-HMS and other water resources engineering courses since 1997 throughout the U.S. and Latin America. Marty is fluent in Spanish and teaches all of WEST's Spanish language courses.