

# Watershed Modeling Using the New HEC-HMS

March 13–15, 2007

Las Vegas, Nevada

May 16–18, 2007

Madison, Wisconsin

Learn how to use the features of the all-new Version 3.1 of the Hydrologic Modeling System (HEC-HMS) to:

- ✓ Process historic and design-storm rainfall data
- ✓ Compute basin runoff for existing and modified conditions
- ✓ Route flood waves through channels
- ✓ Model detention storage with new HMS options

**Enrollment is limited.**  
**Enroll early to ensure your place in this hands-on course!**

*Printed on recycled paper.*



COLLEGE OF ENGINEERING  
UNIVERSITY OF WISCONSIN - MADISON

Department of Engineering Professional Development  
432 North Lake Street · Madison, Wisconsin 53706

Nonprofit  
Organization  
U.S. Postage  
PAID  
University of  
Wisconsin



THE UNIVERSITY  
of  
**WISCONSIN**  
MADISON

COLLEGE OF ENGINEERING ■ DEPARTMENT OF ENGINEERING PROFESSIONAL DEVELOPMENT

**Enrollment  
Limited!**

## Watershed Modeling Using the New HEC-HMS

**March 13–15, 2007**  
**Las Vegas, Nevada**

**May 16–18, 2007**  
**Madison, Wisconsin**

Learn how to use the features of the all-new Version 3.1 of the Hydrologic Modeling System (HEC-HMS) to:

- Process historic and design-storm rainfall data
- Compute basin runoff for existing and modified conditions
- Route flood waves through channels
- Model detention storage with new HMS options



# Watershed Modeling Using the New HEC-HMS

March 13–15, 2007 in Las Vegas, Nevada

May 16–18, 2007 in Madison, Wisconsin

Save time and money!  
Inquire about our on-site courses.  
Call 800-462-0876 today!

## HEC-HMS 3.1 Released!

The eagerly awaited release of HEC-HMS, Version 3.1 now provides hydrologic modelers with a Windows-based program that represents a significant advancement over HEC-1.

Version 3.1 includes updated versions of prior HEC routines and combines them with powerful new algorithms. The new version offers an integrated work environment, including a graphical interface that permits seamless movement between the different parts. It has many new capabilities, including reservoir routing and continuous soil moisture accounting.

## Take Home Valuable Materials

All attendees will receive a course notebook and a CD-ROM with the new HEC-HMS, Version 3.1 and HEC-DSSVue software. In addition, the CD also includes all the program documentation you need, reference manuals from the U.S. Army Corps of Engineers and the National Resource Conservation Service (formerly SCS), and the workshop files from this course.

## Hands-On Course Approach

This course will use lectures, hands-on computer workshops, and workshop reviews to provide you with a solid foundation in HEC-HMS 3.1. Course topics include historic and synthetic rainfall events, loss models, unit hydrograph techniques, baseflow models, calibration techniques, detention storage and channel routing. The course will also cover the HEC-DSSVue program and using HEC-HMS with HEC-RAS. The Hydrologic Engineering Center developed the computer program and training course for the U.S. Army Corps of Engineers.

## Who Should Attend

This course is designed for engineers, hydrologists, and project managers who need to estimate the runoff response from synthetic or historic rainfall events on watersheds, floodplains and design facilities. It will also provide an excellent foundation for existing HEC-1 users wishing to make the transition to the Windows-based HEC-HMS. No prior experience with the program is required; however, some experience with hydrologic procedures would be helpful.

## What You Will Learn

Participants will learn how to simulate runoff from storm rainfall on watersheds using the all-new Version 3.1 of the Hydrologic Modeling System (HEC-HMS). You will know how to process historic and design-storm rainfall data, estimate losses, transform rainfall excess to direct runoff with unit hydrographs, route flood waves, calibrate model parameters, and model runoff from subdivided watersheds. While the program provides multiple procedures for most computations, you will use the SCS (now NRCS) procedures during workshops.

## Earn Continuing Education Credits

At the conclusion of this course, you will receive a personalized certificate documenting that you have earned 2.1 Continuing Education Units (CEU) and 21 Professional Development Hours (PDH).

### For Related Course Descriptions

[http://epd.engr.wisc.edu/  
catalogs/civil.lasso](http://epd.engr.wisc.edu/catalogs/civil.lasso)

## Course Instructor

**Vernon Bonner PE** is one of the nation's most experienced and knowledgeable HEC-HMS trainers. For 20 years he served as chief of the Training Division at the Hydrologic Engineering Center, Davis, California. He managed and participated in the development of software (HEC-2, HEC-RAS, HEC-5, HEC-RES) and the conduct of technical studies for the national floodplain management program, the national hydropower assessment, and several basin-wide reservoir systems. He has more than 35 years of water resource engineering experience in water resource planning, reservoir-system analysis, river hydraulics, floodplain management, and program administration.

Mr. Bonner has presented seminars and workshops for numerous state and federal agencies, universities and professional organizations in floodplain hydrology (HEC-1, HEC-HMS), river hydraulics (HEC-2, HEC-RAS, UNET), and reservoir system analysis (HEC-5, HEC-RES).

## Enrollment is Limited

Because this course provides hands-on computer experience with the new HEC-HMS, enrollment will be limited to make sure that each attendee can receive individualized instruction. Please enroll early to ensure your place.

# Watershed Modeling Using the New HEC-HMS

March 13–15, 2007 in Las Vegas, Nevada

May 16–18, 2007 in Madison, Wisconsin

## Course Outline

### Day One

**7:45 Registration/Continental Breakfast (provided)**

**March 13 in Las Vegas:**

Riviera Hotel and Casino  
2901 Las Vegas Boulevard South

**May 16 in Madison:**

The Pyle Center  
702 Langdon Street

**8:15 Introduction**

Howard Rosen

Program Director

Department of Engineering  
Professional Development

University of Wisconsin–Madison

**8:30 Introduction to HEC-HMS**

Overview of hydrologic modeling with HMS, rainfall-runoff model, methods provided, steps to develop models, role of HEC-DSS, and program limitations

**9:30 Break**

**9:45 Workshop 1: Using HEC-HMS**

**11:15 Review Workshop 1**

**11:45 Lunch (provided)**

**12:45 Basin Rainfall Analysis**

Overview of types of rainfall data used in runoff computation: types and sources of gauged data; spatial averaging of rainfall data using user-specified weights and automated inverse-distance weighting

**1:45 Break**

**2:00 Estimating Rainfall Loss Rates**  
Definition of “loss rates”; initial plus constant loss rate; SCS Curve No. method; Green and Ampt method; pros and cons of methods

**3:00 Workshop 2: Rainfall and Loss Rate Computation**

Part A: Analysis of an observed rainfall event; estimation of loss rate parameters

Part B: Comparison of different methods of spatially averaging rainfall

**4:30 Adjournment**

### Day Two

**8:00 Review Workshop 2**

**8:30 HEC-DSS in HMS**

DSS output from HMS; record labeling; DSSVue for input and output, advantages over HMS options

**9:00 Break**

**9:15 Hypothetical Storms**

Overview of synthetic storms; use of NWS generalized rainfall data to develop frequency-based design storms; and hypothetical frequency curves

**10:15 Unit Hydrograph Approach to Rainfall-Runoff Modeling**

Unit hydrograph (UH) approach; definition of UH; application of UH; definition of synthetic UH; Clark method; SCS method; Snyder method; selection of method; representation of baseflow

**11:00 Workshop 3: Computing Hydrographs Using Synthetic Unit Hydrographs**

Part A: Development of unit hydrograph parameters for example watershed using standard methods; incorporation of these parameters into an HMS model; evaluation of results using observed data

Part B: Comparison of different characterizations of sub-basins with unit hydrographs

**11:45 Lunch (provided)**

**12:45 Workshop 3 (continued)**

**2:30 Review Workshop 3**

**3:15 Break**

**3:30 Reservoir Routing**

Storage routing, available storage-outflow options, specified outflow, dam and outlet modeling, and input requirements

**4:30 Adjournment**

### Day Three

**8:00 Channel Routing**

Routing concepts and methods; Modified Puls, Muskingum method; Kinematic wave, and Muskingum-Cunge; advantages and disadvantages of each

**9:15 Break**

**9:30 Workshop 4: Channel Routing**

Become familiar with typical study data to perform a Muskingum-Cunge routing with the HEC-HMS model. The routing parameters developed during this workshop will be used in subsequent workshops.

**11:00 Review Workshop 4**

**11:45 Lunch (provided)**

**12:45 Multi-Basin Modeling**

Criteria for partitioning a watershed into sub-basins; data considerations, study needs, and model requirements; parameter estimation issues, which surface when developing multi-basin model; verification of complete model

**1:45 Workshop 5: Multi-Basin Modeling**

Complete an HMS multiple sub-basin model using parameters developed during previous workshops; verify the complete model using an observed event and make adjustments; calibrate loss rates using a known frequency curve

**3:15 Review Workshop 5**

**4:00 Final Adjournment**

## On-site Courses Save Time & Money!

With a guaranteed enrollment of at least 17 persons at the normal course fee, Engineering Professional Development can deliver this HEC-HMS course:

- At a location of your choice in North America
- At a time of your convenience

To inquire about holding this course at your site or about other on-site course opportunities, call Howard Rosen, program director, at 800-462-0876. Or check our Web site at <http://epd.engr.wisc.edu/onsite>

## Other Storm Water Courses

The University of Wisconsin–Madison offers a series of courses covering the key elements of storm water drainage system design. Additional upcoming courses in this series include the following:

### *Designing Efficient Culverts and Open Channels*

March 26–28, 2007, Madison, WI  
Course #H823

### *Using HEC-RAS to Compute Water Surface Profiles for Floodplains, Bridge and Culvert Hydraulics*

May 21–23, 2007, Madison, WI  
Course #H792

For details on these and other storm water courses, check our Web site at <http://epd.engr.wisc.edu/catalogs/civil.lasso>

## Contact Us

Call toll free **800-462-0876** and ask for

**Program Director:** Howard Rosen  
**Program Associate:** Sandra Selvon-Semin  
Or e-mail [custserv@epd.engr.wisc.edu](mailto:custserv@epd.engr.wisc.edu)

## Four Easy Ways to Enroll

### General Information

**Fee Covers** Notebook, course materials, HEC-HMS software, user's manual and hydraulic manual, break refreshments, lunches and certificate. Course materials are distributed only to participants. We do not publish proceedings.

**Cancellation** If you cannot attend, please notify us no later than seven days before the start of the course, and we will refund your fee. Cancellations received after this date and no-shows are subject to a \$150 administrative fee. You may enroll a substitute at any time before the course starts.

### Locations/Accommodations

#### Las Vegas Offering, March 13–15, 2007

The Las Vegas offering of this course will be held at the Riviera Hotel and Casino, 2901 Las Vegas Boulevard South.

We have reserved a block of sleeping rooms (\$119/single, \$119/double plus energy surcharge not to exceed \$3.85 per night) for course participants at the Riviera Hotel and Casino, the course site. A deposit equal to the room rate for one night is charged at time of booking. This deposit is refundable if the reservation is canceled 48 hours prior to scheduled arrival. Room block rates are not available for Friday or Saturday night stays. To reserve a room, call 800-634-6753 or 702-794-9412 and indicate that you will be attending this course under group code UWMAMA7. Room requests made later than February 23 will be subject to availability.

#### Madison Offering, May 16–18, 2007

The Madison offering of this course will be held at The Pyle Center, 702 Langdon Street.

We have reserved a block of sleeping rooms (\$79/single, \$89/double, including parking and continental breakfast) for course participants at the Lowell Center, 610 Langdon Street in Madison. To reserve a room, call 866-301-1753 or 608-256-2621 and indicate that you will be attending this course under group code H796. Room requests made later than April 16 will be subject to availability.



**Phone:**  
**800-462-0876** or  
608-262-1299 (TDD 265-2370)



**Internet:**  
<http://epd.engr.wisc.edu/>

**Mail to:**

Engineering Registration, The Pyle Center  
702 Langdon Street, Dept. 108  
Madison, Wisconsin 53706



**Fax:**

**800-442-4214** or 608-265-3448



### Course Information

Please enroll me in **Watershed Modeling Using the New HEC-HMS**

- Course #H888** March 13–15, 2007 in Las Vegas, Nevada Fee: \$995
- Course #H796** May 16–18, 2007 in Madison, Wisconsin Fee: \$895
- I cannot attend at this time. Please send me brochures on future courses.

### Personal Information (Please print clearly.)

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ Fax (\_\_\_\_) \_\_\_\_\_

E-mail \_\_\_\_\_

### Additional Enrollees

Name \_\_\_\_\_

Title \_\_\_\_\_

E-mail \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

E-mail \_\_\_\_\_

### Billing Information

Bill my company  P.O. or check enclosed (Payable in U.S. funds to UW–Madison)



Cardholder's Name \_\_\_\_\_

Card No. \_\_\_\_\_ Expires \_\_\_\_\_

UW#

**Important—please enter the 3-digit UW# Code from the mailing label.**

Please check the box if you are a person with a disability and desire special accommodations. A customer service representative will contact you. Requests will be kept confidential.