# AGENDA

Hydrologic Engineering Center

Training course on

## Water Resources Data Management with HEC-DSSVue

## Course Control Number #152

Davis, California

       This class is designed to provide Corps water resource professionals with the basic skills to utilize the HEC Data Storage System (HEC-DSS) to manage, analyze and display data using the HEC Data Storage System Visual Utility Engine (HEC-DSSVue) and associated programs.  The procedures and programs to be presented will provide a convenient system to support a wide variety of hydrologic investigations including project planning and real-time water control.  Workshops will demonstrate some of the potential applications.  Upon completion, participants will have sufficient knowledge to plan applications for their studies.

## Monday

| Time | Activity |
|---|---|
| 8:00 – 9:00 a.m. | **INTRODUCTION AND PRE-TEST** |

9:00 – 10:00 a.m.     1.1 Lecture:     **INTRODUCTION TO THE HEC DATA STORAGE SYSTEM**

General concepts of HEC-DSS, what it is, how and why it is used.  Comparison to other database systems.  Creation, retrieval and storage of HEC-DSS data. Records, pathnames, time-series conventions, and paired data conventions.

10:00 – 10:15 a.m.     Break

10:15 – 11:15 a.m.     1.2 Lecture:     **OVERVIEW OF HEC-DSSVUE**

Overview of the HEC-DSSVue graphical user interface tool and its basic functionality.  System requirements, installation and execution. Cataloging, selecting, tabulating and graphing data. Utility functions for managing HEC-DSS files.

11:15 – 11:45 a.m.     1.3 Workshop:  **OVERVIEW OF HEC-DSSVUE**

Executing HEC-DSSVue, cataloging files.  Plotting and tabulating data.  Copying plots and tables to the clipboard for use in other programs.

11:45 – 12:45 p.m.     Ice Breaker Lunch

12:45 – 1:15 p.m.     1.3 Workshop **(Continued)**:     **OVERVIEW OF HEC-DSSVUE**

Executing HEC-DSSVue, cataloging files.  Plotting and tabulating data.  Copying plots and tables to the clipboard for use in other programs.

1:15 – 1:30 p.m.     Workshop Review

1:30 – 2:30 p.m.     1.4 Lecture:     **GRAPHICS CAPABILITIES OF HEC-DSSVUE**

Capabilities of graphics within HEC-DSSVue.  User interfaces for setting plot characteristics.  Saving and retrieving plot characteristics using "templates". Applicability of templates to other data sets.  Setting and using "default line styles" to set plot characteristics based on data parameter types.

2:30 – 2:45 p.m.     Break

2:45 – 3:45 p.m.     1.5 Workshop:  **GRAPHICS CAPABILITIES OF HEC-DSSVUE**

Creating complex graphs.  Saving and retrieving graphs characteristics in templates.  Setting and using default line styles.

3:45 – 4:00 p.m.     Workshop Review

4:00 – 5:00 p.m.     1.6 Lecture:     **DATA ENTRY AND EDITING WITH HEC-DSSVUE**

Manual entry of time series and paired data into HEC-DSS.  Copying data from other applications into HEC-DSS.  Editing individual values and filling blocks of values using HEC-DSSVue's tables and graphical editor.

## Tuesday

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| 8:00 – 8:15 a.m. | Review of Monday (Perryman) |

**8:15 – 9:15 a.m.**  2.1 Workshop:  **DATA ENTRY AND EDITING WITH HEC-DSSVUE**

Entering time series and paired data into HEC-DSS.  Copying data from the other applications into HEC-DSS.  Using tables to edit data and perform data fill functions.  Using the HEC-DSSVue graphical editor.

**9:15 – 9:30 a.m.**  Workshop Review

**9:30 – 10:30 a.m.**  2.2 Lecture:  **EXCHANGING HEC-DSS DATA WITH EXTERNAL SOURCES**

Using HEC-DSSVue to read and write Microsoft Excel files to import and export HEC-DSS data. Use the USGS HEC-DSSVue plugin to import data from the U.S. Geological Survey's National Water Information System into HEC-DSS.  Using NWSDSS to import precipitation data from the National Climatic Data Center into HEC-DSS.

**10:30 – 10:45 a.m.**  Break

**10:45 – 11:45 p.m.**  2.3 Workshop:  **EXCHANGING HEC-DSS DATA WITH EXTERNAL SOURCES**

Use HEC-DSSVue to read and write Microsoft Excel files to import and export HEC-DSS data. Use the USGS HEC-DSSVue plugin to import data from the U.S. Geological Survey's National Water Information System into HEC-DSS.  Use NWSDSS to import precipitation data from the National Climatic Data Center into HEC-DSS.

**11:45 – 12:00 p.m.**  Workshop Review

**12:00 – 1:00 p.m.**  Lunch

**1:00 – 2:00 p.m.**  2.4 Lecture: **HEC-DSS VERSION 7 FEATURES**

Overview of new features in HEC-DSS 7; Including efficiency, file sizes, compression, multi-threading, ensemble collections, and documentation.

**2:00 – 3:00 p.m.**  2.5 Lecture:  **MATHEMATICAL COMPUTATIONS - PART I**

Overview of math functions available in HEC-DSSVue.  Arithmetic, general and smoothing functions.

**3:00 – 3:30 p.m.**  Break

**3:30 – 4:30 p.m.**  2.6 Workshop:  **MATHEMATICAL COMPUTATIONS – PART I**

Compute a reservoir inflow from gaged elevation data using HEC-DSSVue's math functions to screen and estimate data, manipulate time series, and perform rating table operations.

**4:30 – 4:45 p.m.**  Workshop Review

**<u>Wednesday</u>**

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| 8:00 – 8:15 a.m. | Review of Tuesday |

8:15 – 9:15 a.m.     3.1 Lecture:     **MATHEMATICAL COMPUTATIONS - PART II**

Time transformations, Statistics.

9:15 – 10:15 a.m.     3.2 Workshop:  **MATHEMATICAL COMPUTATIONS - PART II**

Time transformations, Statistics.

10:15 – 10:30 a.m.     Break

10:30 – 10:45 a.m.     Workshop Review

10:45 – 11:45 a.m.     3.3 Lecture:     **MATHEMATICAL COMPUTATIONS - PART III**

Overview of statistical math functions available in HEC-DSSVue, including linear regression, duration analysis, frequency curves, and cyclic analysis.

11:45 – 12:45 p.m.     Lunch

12:45 – 1:30 p.m.     3.4 Workshop:  **MATHEMATICAL COMPUTATIONS - PART III**

Analyze reservoir data with HEC-DSSVue statistical functions to calculate important attributes of datasets and illustrate relationships among them.

1:30 – 1:45 p.m.     Workshop Review

1:45 – 2:45 p.m.     3.5 Lecture:     **HEC-DSSVUE UTILITIES AND TOOLS**

Management of HEC-DSS files.  Renaming, duplicating and copying records. Time Window and use of data in water years.  Groups.

2:45 – 3:00 p.m.     Break

3:00 – 4:00 a.m.     3.6 Workshop:  **HEC-DSSVUE UTILITIES AND TOOLS**

Management of HEC-DSS files.  Renaming, duplicating and copying records. Time Window and use of data in water years.  Groups.

4:00 – 4:15 p.m.     Workshop Review

4:15 – 5:00 p.m.     3.7 Lecture:     **PIE CHARTS AND INTRODUCTION TO SCRIPTING**

Producing pie charts with HEC-DSS data.  Scripting basics.

**Thursday**

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|---|---|
| 8:00 – 8:15 a.m. | Review of Wednesday |

8:15 – 9:15 a.m.    4.1 Workshop:  **PIE CHARTS AND INTRODUCTION TO SCRIPTING**

Producing pie charts with HEC-DSS data.  Scripting basics.

9:15 – 10:15 a.m.    4.2 Lecture:    **CUSTOMIZING HEC-DSSVUE FUNCTIONALITY**

Overview of the HEC-DSSVue Jython scripting facility.  Creating, editing, and saving scripts using the Script Browser.  Using the scripting interface to access HEC-DSS files, execute math functions, and create custom plots.  Using Jython methods to access operating system functions and external programs with scripts.  Executing HEC-DSSVue scripts from the command line.  Using Java to access HEC-DSSVue functionality.  Developing HEC-DSSVue plugins in Java.  Comparison of HEC-DSSVue scripts to plugins.

10:15 – 10:30 a.m.    Break

10:30 – 11:30 a.m.    4.3 Workshop:  **CUSTOMIZING HEC-DSSVUE FUNCTIONALITY**

Create a script to tabulate and graph data.  Create a script to perform math functions on data sets and plot the results.  Generate plots through the Windows Command Line, without displaying the main HEC-DSSVue user interface.

11:30 – 11:45 a.m.    Workshop Review

11:45 – 12:45 p.m.    Lunch

12:45 – 1:30 p.m.    4.4 Lecture:    **MANAGING HEC-DSS GRIDDED DATA**

Representing grids of data in DSS. How grids are geo-referenced in DSS. Loading grid data into DSS. Options for displaying, analyzing, and computing with grids in DSS.

1:30 – 2:30 p.m.    4.5 Workshop:  **MANAGING HEC-DSS GRIDDED DATA**

Sources of grid data. Tools for loading grids into DSS. Displaying grids in DSSVue. Basic math operations on grids.

2:30 – 2:45 p.m.    Workshop Review

2:45 – 3:00 p.m.    Break

3:00 – 4:00 p.m.    4.6 Lecture:    **SPATIAL DATA VISUALIZATION WITH HEC-RTS**

Overview and purpose of HEC-RTS, in particular the Watershed Setup and Visualization modules.  Various types of time series icons. Configuration of HEC-RTS, including adding map backgrounds, setting up time series icons and gridded data sets for visualization.

4:00 – 5:00 p.m.    4.7 Workshop:  **SPATIAL DATA VISUALIZATION WITH HEC-RTS**

Create a sample watershed, add map backgrounds.  Configure several time-series icons, and plot and tabulate data for those icons from the main window. Define a gridded data set and animate it.

## **Friday**

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| 8:00 – 8:15 a.m. | Review of Wednesday |

8:15 – 9:15 a.m.    5.1 Lecture:      **LEGACY HEC-DSS UTILITIES**

Overview of legacy HEC-DSS utility programs. Reasons why they might be used. Generate various catalog formats, as well as display, export, and import data with DSSUTL. Screen and transform data with DSSMATH. Generate tabular and HTML reports with REPGEN.

9:15 – 10:15 a.m.    5.2 Workshop:  **LEGACY HEC-DSS UTILITIES**

Using DSSUTL to Generate full, condensed, and abbreviated catalogs of HEC-DSS files also using sort order and selective pathnames. Output data to a file. Using DSSMATH to screen and transform data in preparation for reporting. Use REPGEN to generate reports of various formats from the same data.

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| 10:15 – 10:30 a.m. | Break |
| 10:30 – 11:00 a.m. | Workshop Review |
| 11:00 – 11:30 a.m. | **CRITIQUE AND POST-TEST** |