Nile Basin Initiative Secretariat (Nile-SEC)

Nile Basin Decision Support System (NB DSS)

e-Learning Course Syllabus

https://elearn.nilebasin.org

September 2016

Introduction

The DSS elearning course seeks to introduce you to the Nile Basin Decision Support System (NB DSS). The NB DSS is an analytical tool, a common computer-based platform for communication, information management and analysis of water resources. It provides a framework for sharing knowledge, understanding river system behavior, evaluating alternative development and management strategies, and supporting informed decision making.

This course consists of 11 modules and you are expected to take 1 module per week. This DSS course is classified into three levels; basic, intermediate and advanced

1. Basic level: a 'Certificate of successful completion of DSS Basic level' is issued.
2. Intermediate level: a 'Certificate of successful completion of DSS Intermediate level' is issued.
3. Professional level: a 'Certificate of successful completion of DSS Professional level' is issued.

Requirements

Participants are expected to have formal training or experience in at least one of the following areas; water resources management, hydrology, meteorology, energy, GIS/mapping, environment, agriculture or research. You are expected to have basic knowledge of water resources modeling using any GIS based model. In order to operate the Nile Basin DSS tool, you need to obtain a license from the Nile Basin secretariat.

Registration and Login

Participants are required to register with the Learning Management System prior to logging into the NBI Learning Management System. To register for the NBI Induction or DSS certificate program, please go to the NBI Learning Management System: https://elearn.nilebasin.org where you will be asked to register. Please create your NBI-eLearningCourses account by completing all required fields and agree to the terms of service. After getting your account, you can log into the Learning management system and access the LMS dashboard

Enrolling for Nile Basin Decision Support System course

Participants are required to enroll in a DSS course prior to accessing its content. Select a DSS course from the dashboard and enroll in the selected course. For example "Enroll in DSS 1-11"

NB DSS Course Content

Module	Topics	Learning Objectives
Nile Basin Decision Support System		
Basic - Certificate of participation is issued		

1:	DSS Installation	After completing the lessons in this module you will have installed the DSS successfully on your computer. The module Introduces you to;
		• the various installation requirements of the DSS Software that include minimum hardware requirements, OS recommendations, user privileges, software prerequisites and licensing requirements.
		• the DSS installation process. This includes installation of:
		  1. MIKE Zero Installation (Includes installation of Mike 11 and Mike Hydro)
		  2. MIKE by DHI License installation (Stand-alone/Network)
		  3. PostgreSQL Database Installation on Windows and configuring PostgreSQL on Windows to allow remote connections (only for Corporate version under Windows)
		  4. PostGIS installation on Windows
		  5. DSS installation

2	DSS User Interface	After completing the lessons and exercises in this section you will be familiar with the DSS User Interface functionalities. The module Introduces you to; • the DSS software layout and components.

		• the functions under each menu bar element (i.e. the connection, view and settings sub-menus). • to two special windows which are the 'Properties' window and the 'Tools Explorer' window.
3	Database Manager Utility and System Manager	After completing the lessons and exercises in this module you will be able to use the "Database Manager Utility" for managing databases, workspaces and users as well as the "System Manager" for the management of workspaces and users from within NB DSS. The module Introduces you to; • definitions and concepts for the Database Manager Utility • management of the DSS databases using the Database manager utility. This includes creating, backing up, dropping, restoring and updating databases. • management of the workspaces within a DSS database using the Database manager utility. This includes creating, exporting, importing, deleting and sharing workspaces. • management of the users using the Database manager utility. This includes creating, deleting and editing properties of a user and assigning users to workspaces. • how a user can login to the DSS and activate the 'System' manager. • management of workspaces and users using the 'System' manager and the overlap in functionality with the Database manager utility.
4	Time Series Manager	After completing the lessons and exercises in this module you will be able to use the "Time Series Manager" for the management of time series data. The module Introduces you to; • time series definitions, concepts and shows the list of tools that are available for use with time series. • the manager's components and basic tasks. • time series data handling and visualization. • linking time series data to GIS features. • handling changes and metadata • time series calculation and processing tools • time series data analysis tools • working with ensembles
Intermediate - Certificate of successful completion is issued		
5	GIS Manager	After completing the lessons and exercises in this module you will be able to use the GIS Manager to manage vector and raster GIS data within the DSS. The module Introduces you to; • the GIS, its uses, data formats and data projections. This is then followed by an explanation of how the GIS data is handled within the DSS. It concludes with a list of tools that exist in the DSS to handle GIS data. • the components of the GIS Manager and basic tasks such as activating the manager and organizing data within the manager. • how vector and raster data can be created or imported, moved or removed, visualized, edited and exported in the GIS Manager. • the change log and metadata sections of vector and raster data. It also shows how they can be used. • to how GIS functions within the DSS can be used to select vector data by attribute or spatial location. • Vector and raster data processing: This lesson describes how GIS tools within the DSS can be used to dissolve vector data or create Thiessen polygons. It also shows you how resampling raster data and producing zonal statistics are achieved within the DSS. • to how the following GIS tools can be used on raster data:

		o Raster calculator o Interpolation o Catchment delineation o temporal analysis • to the conversion between raster and vector formats.
11	Model tutorial	After completing the lessons and exercises in this module you will be able to use the DHI modeling tools. The module Introduces you to; • MIKE Hydro and guides you through the set-up of a model and simulation of a simple catchment system. • NAM and guides you through the set-up of a model and simulation of a simple Rainfall-Runoff process. • MIKE 11 and guides you through the set-up of a model and simulation of a simple river system. • MIKE SHE and guides you through the set-up of a model and simulation of a catchment (rainfall-runoff) process.
6	Scenario Manager	After completing the lessons and exercises in this module you will be able to use the Scenario Manager. The module Introduces you to; • definitions and concepts that apply to all lessons. • the manager's components and basic tasks such as activating the manager and organizing data within the manager. • the model registration (i.e. importing) process in the DSS. The process is explained showing the related concepts and prerequisites. Once the model is registered, visualization of its components is also presented. • configuration and modification (editing) of scenarios, in the DSS. It also shows how to run a scenario by creating and running a simulation as well as viewing the results. • how different scenario simulation results can be compared within the DSS. • the use of ensemble data in scenarios and viewing the results. • the concept of model linking within the DSS. • the use of optimization techniques to optimize the modeling results within the DSS (e.g. maximizing the power generated at a dam).
7	Script Manager	After completing the lessons and exercises in this module you will be able to use the Scripts Manager to manage scripts within the DSS. The module Introduces you to; • to script definition in general and within the DSS, uses of scripts in the DSS. It then gives an overview of the 'Iron Python' the scripting language used in the DSS. • a basic explanation of language components and their syntax. • the Script Manager components, how scripts are stored in the DSS, DSS script types and to some basic tasks such as activating the manager. • Creating simple scripts: This lesson shows you how you can create, debug and save a simple script in the DSS. • to the change log and metadata sections of each script. It also shows how they can be used. • how you can create, debug and save a complex script in the DSS. • the DSS predefined scripts. It also shows you how you can expand the predefined indicators • two advanced scripting topics, namely, using the DSS Application Programming Interface in scripts (including accessing DSS objects such as time series, GIS layers, scenarios and spreadsheets) and using DSS tools in a script.
8	Spreadsheet Manager	After completing the lessons and exercises in this module you will be able to

		use the "Spreadsheet Manager" to manage tabular data within the DSS. The module Introduces you to; • the spreadsheet concept and the uses of a spreadsheet followed by an explanation of the DSS Spreadsheet manager and its components. It concludes with a list of the function categories that exist in the DSS with a focus on those functions related to the DSS functionalities. • to basic tasks such as activating the manager, organizing data within the manager, adding a new spreadsheet, using the toolbars and context menu, opening and adding data to a spreadsheet. • how data in a spreadsheet can be formatted and visualized. • to the change log and metadata sections of each spreadsheet. It also shows how they can be used. • how functions can be used in a spreadsheet. It also shows how data can be imported into or exported from a spreadsheet. Finally it explains how scripts can be used within a spreadsheet.
Professional - Professional certificate is issued		
9	Indicator Manager	After completing the lessons and exercises in this module you will be able to use the Indicator Manager to manage indicators data within the DSS. The module Introduces you to; • to indicator definition in general and within the DSS, uses of indicators in the DSS. It then describes the connection between indicators and scripts in the DSS and also the linkage between Scenario Manager and Indicator Manager. • basic tasks such as activating the manager, organizing indicators in groups within the manager. • how you can add a new indicator. This process involves the following steps: • how you can create a script to calculate the indicator (or use an already created script) • defining the details of an indicator • describing indicator parameter types • assigning the parameters • saving an indicator • calculating an indicator • the DSS predefined indicators. It also shows you how you can expand the predefined indicators
10	Analysis Manager	After completing the lessons and exercises in this module you will be able to use the "Analysis Manager" to undertake MCA and CBA within the DSS. The module Introduces you to; • the 'Analysis' manager and also some definitions and concepts that help you understand the process of undertaking a Multi Criteria Analysis (MCA) and/or a Cost Benefit Analysis (CBA) within the DSS. • what is required to undertake a CBA in the DSS. • the process of setting up a CBA within the DSS through an example. • how you can visualize the CBA results and also explains how you can interpret them. • what is required to undertake an MCA in the DSS. • the process of setting up an MCA within the DSS through an example. • how you can visualize the MCA results and also explains how you can interpret them.