

TNRIS Technical Training Program

FY 2012 Course Descriptions

January 24-26, 2012

ArcGIS Desktop II: Tools and Functionality

Overview

ArcGIS Desktop software in an integrated system that includes all the tools needed to get the most out of a GIS. This course teaches the range of functionality available in the software and the essential tools for visualizing, creating, managing, and analyzing geographic data. The hands-on course exercises emphasize practice with ArcMap and ArcCatalog to perform common GIS tasks and workflows. You will use the tools to create and manage geographic data, display data on maps in different ways, and combine and analyze data to discover patterns and relationships. You will learn how ArcGIS Desktop provides a complete GIS software solution and you will be prepared to start working with the software on your own.

Intended Audience

This course is designed for those with knowledge of basic GIS concepts. Target students have either an education in or workplace experience with GIS, but no ArcGIS software experience.

Topics Covered

- Listing common GIS tasks and identifying which ArcGIS Desktop application is used for each task.
- Understanding what the geodatabase offers for GIS data storage.
- Creating and editing geodatabase features.
- Controlling the appearance and display of data layers in ArcMap.
- Classifying and symbolizing map data.
- Labeling map features.
- Changing the coordinate system and map projection used to display a dataset.
- Accessing feature information in tables and control table display properties.
- Querying and analyzing GIS data.
- Building a simple model to automate a GIS analysis workflow.
- Creating presentation-quality maps and graphs.

Prerequisites

Students should have completed *ArcGIS Desktop I: Getting Started with GIS* or have equivalent knowledge.

February 1-2, 2012

What's New in ArcGIS 10?

Overview

The first time you open ArcMap 10, it is obvious that things have changed. Windows can be docked in the application and tools seem to have disappeared, though really they have been enhanced and relocated. Also, new tools make workflows more efficient, and modifications have been made to the structure of the data and to the software licensing. This two-day class will acquaint you with the new interface, provide tips on upgrading to ArcGIS 10, and link the older version of the software with the new.

Intended Audience

This course is for those who are comfortable with ArcGIS and want to learn about the many new changes in version 10 of the software.

Topics Covered

Day 1

- **Structure and Licensing (Migrating to ArcGIS 10; Map Documents; Geodatabase; Tables and Fields; Licensing and Help)**
- **Basic Interface Changes (ArcMap Changes; Toolbar Changes; Catalog Window; Search Window; Item Descriptions; Map Document Properties)**
- **Map Production and Layouts (Data Frames; Basemap Layers; Packaging; Symbology; Dynamic Text; Templates)**
- **Basic Editing (Modified Snapping Environment; New Editor Toolbar; Feature Templates; Mini-Toolbars; Modifying Attributes)**

Day 2

- More Interface and Table Changes (Main Menu Changes; Geoprocessing Menu; Table Relationships; Table Attachments; Image Analysis; Time Slider)
- Layouts and Packages (Modifying Dynamic Text; Data Driven Pages; Print/Export; Packages)
- Editing with Feature Templates (Creating Feature Templates; Filtering and Grouping; Searching; Managing; Sharing)
- ModelBuilder and Python (Changes to ModelBuilder; New Python Window; ArcPy)

Prerequisites

Students should have knowledge of Microsoft Windows and be familiar with the basic use of ArcGIS, including the topics covered in either the *Fundamentals of ArcGIS* or *ArcGIS Desktop I*.

February 7-8, 2012

ArcGIS Desktop III: Workflows and Analysis

Overview

Understanding how and when to apply ArcGIS tools and functions is the key to creating an efficient GIS workflow. Building on the skills and knowledge taught in *ArcGIS Desktop II: Tools and Functionality*, this course shows how to apply ArcGIS tools in a workflow context with a focus on working with data stored in a geodatabase and performing geoprocessing and analysis. In the course exercises, you organize and edit data stored in a geodatabase, prepare data for analysis, create and edit geoprocessing models using ModelBuilder, and work through a challenging analysis project.

Intended Audience

This course is designed for experienced ArcGIS users who want to learn more about the ArcGIS tools for creating and editing data and GIS analysis.

Topics Covered

- Adding data from different sources into a geodatabase.
- Creating subtypes and using them when editing data.

- Validating geodatabase feature geometry and attributes.
- Editing data using a geodatabase topology.
- Creating and editing geodatabase annotation.
- Creating and editing metadata using a template.
- Creating custom symbols and style sheets.
- Creating and applying a custom map template.
- Running analysis tools using dialog boxes, models, and the command line window.
- Building a complex model using ModelBuilder.

Prerequisites

Students should have completed *ArcGIS Desktop II: Tools and Functionality* or have equivalent knowledge.

March 27-28, 2012

ArcGIS Desktop I: Getting Started with GIS

Overview

This course provides the foundation for understanding what GIS is, what it can do, and how others are using it. This course teaches the skills and knowledge needed to take other ArcGIS Desktop courses.

You will learn the basic functions of a GIS, why a GIS database is powerful, and what coordinate systems and map projections are and why they are important. The course exercises teach you to work with ArcMap to visualize geographic data, create maps, query a GIS database, perform spatial analysis using common analysis tools, and solve geographic problems using a systematic approach.

Intended Audience

This course is designed as an introduction for students who are new to GIS and ArcGIS.

Topics Covered

- The big picture of GIS: basic functions of a GIS; real-world applications.
- Exploring GIS maps: defining features, layers, and data frames; exploring map scale; understanding the relationship between features and attributes.

- **Exploring a GIS database:** exploring attribute tables; identifying features; symbolizing features based on their attributes; labeling features based on their attributes.
- **Creating map layouts:** understanding data view and layout view; using the layout toolbar; using map templates; modifying map elements; printing maps.
- **Understanding location:** defining coordinate systems and map projections; reading and finding location coordinates on a map; measuring area and distance on a map.
- **Understanding raster and vector data:** representing geography; storing real-world locations; symbolizing rasters; using raster and vector data together; understanding geodatabases.
- **Acquiring geographic data:** data formats; methods of creating geographic data; using ArcCatalog to explore geographic data; using metadata.
- **Querying data:** understanding and performing attribute queries; understanding and performing spatial queries.
- **Analyzing spatial relationships:** understanding overlay; understanding buffer; accessing tools in ArcToolbox; performing union and intersect; buffering features.

Prerequisites

Students should be familiar with Windows-based software for basic file management and browsing.

April 9-10, 2012

Fundamentals of ArcGIS

Overview

ArcGIS is a powerful and complex tool for viewing and analyzing data. With so much functionality available in the software, it can be difficult to get started. This 2-day course teaches essential skills for being efficient with ArcGIS. Explore GIS data through ArcMap and create maps to illustrate relationships in the data. Learn methods of displaying data with symbols and text. Understand how to ask questions of the data and get answers.

Audience

This course is primarily for those who want to learn the basics of ArcGIS.

Topics Covered

Day 1

Introduction to ArcGIS

- **GIS Concepts**
- **ArcGIS Software**
- **ArcMap**

Layer Properties

- **Filtering Data**
- **Symbolizing Data Layers**
- **Labeling Layers**
- **Saving Properties with Layer Files**

Basic Labeling'

- **Label Properties**
- **Label Classes**
- **Expressions**
- **Placement Properties**
- **Priority and Weight Rankings**

Layouts

- **Layout View and Toolbar**
- **Setting Up a Page**
- **Map Scale and Extent**
- **Map Elements**
- **Templates**
- **Printing**

Day 2

Data Types, ArcCatalog, and Metadata

- **ArcCatalog**
- **Metadata**
- **Valid Formats**
- **Contents and Preview Tabs**
- **Managing GIS Data**

Selections and Queries

- **Adding Layers to a Map**
- **Determining Coordinate System**

- **Setting Measure Units**
- **Selecting by Attributes**
- **Selecting by Spatial Relationship**

Projection

- **Spatial Reference Issue**
- **Spatial Reference and ArcGIS**
- **Define Projection Tool**

ArcGIS Online and Wrap-Up

- **Adding data from outside sources**
- **Using data from ArcGIS Online**
- **Wrap-Up and Review**

Prerequisites

Knowledge of Microsoft Windows

May 8-10, 2012

ArcGIS Desktop II: Tools and Functionality

Overview

ArcGIS Desktop software in an integrated system that includes all the tools needed to get the most out of a GIS. This course teaches the range of functionality available in the software and the essential tools for visualizing, creating, managing, and analyzing geographic data. The hands-on course exercises emphasize practice with ArcMap and ArcCatalog to perform common GIS tasks and workflows. You will use the tools to create and manage geographic data, display data on maps in different ways, and combine and analyze data to discover patterns and relationships. You will learn how ArcGIS Desktop provides a complete GIS software solution and you will be prepared to start working with the software on your own.

Intended Audience

This course is designed for those with knowledge of basic GIS concepts. Target students have either an education in or workplace experience with GIS, but no ArcGIS software experience.

Topics Covered

- Listing common GIS tasks and identifying which ArcGIS Desktop application is used for each task.
- Understanding what the geodatabase offers for GIS data storage.
- Creating and editing geodatabase features.
- Controlling the appearance and display of data layers in ArcMap.
- Classifying and symbolizing map data.
- Labeling map features.
- Changing the coordinate system and map projection used to display a dataset.
- Accessing feature information in tables and control table display properties.
- Querying and analyzing GIS data.
- Building a simple model to automate a GIS analysis workflow.
- Creating presentation-quality maps and graphs.

Prerequisites

Students should have completed *ArcGIS Desktop I: Getting Started with GIS* or have equivalent knowledge.

June 25-26, 2012

Intermediate GIS Concepts

Overview

ArcGIS has much more functionality than simple map display and navigation. It has many tools for collecting, creating and analyzing data. This 2-day class teaches finer skills for using ArcGIS. Explore how to connect information between tables and mark locations on the map. Learn methods for creating complex labels and assigning images to a location on the earth. Practice managing data files, creating new data, and putting the data to work to generate answers to questions.

Audience

This course is primarily for those who want to expand their skills in ArcGIS.

Topics Covered

Day 1

Joins and Relates

- **Table joins**
- **Statistics**
- **Summarize**
- **Field calculator**

Add XY Data

- **Importing Excel spreadsheets**
- **Display x,y**
- **Sample tools for importing lines and polygons**

Address Geocoding

- **Using the Address Tools in ArcMap**
- **Geocoding Addresses from a File**

Advanced Labeling

- **Customizing Labels**
- **Formatting Functions**
- **Leader Lines**
- **Stacked Labels**
- **Map Annotation**

Day 2

Creating Data and Georeferencing Images

- **Creating File Geodatabases**
- **Creating Feature Classes**
- **Georeferencing an image**

Beginner Editing

- **Drawing in new features**
- **Using the proper tasks, sketch tools and targets**
- **Setting snapping**
- **Editing attributes**

More Editing

- More Advanced editing Tools
- Tracing
- Map Topology

ArcToolbox

- The Geoprocessing environment
- Buffer, Union, Intersect and various other tools

Prerequisites

Students should have taken the *Fundamentals of ArcGIS* or the *ArcGIS Desktop I* courses.

July 17, 2012

Advanced Labeling

Overview

This one-day course teaches students better ways of putting text on a map in ArcGIS. Students learn how to label with multiple label classes, and utilize priority and weight rankings. Tips and tricks to choosing label styles are discussed, as well as using HTML-like tags and VB Script to format labels. The differences between graphic and geodatabase annotation are discussed at length including the options for creating, storing, and modifying this type of text. Maplex is introduced with its pros and cons over standard labels and annotation.

Intended Audience

This course is for those who are already comfortable with the basics of ArcGIS but who want to learn more about effectively labeling features in ArcGIS.

Topics Covered

Labeling basics

- Label properties
- Label classes
- Expressions
- Placement properties

- **Priority and weight ranking**

Advanced labels

- **Formatting tips and tricks**
- **ArcGIS text formatting tags**
- **VB Script**
- **Jscript**
- **Leader lines**

Annotation

- **Creating**
- **Storing**
- **Modifying**
- **Graphic vs. Geodatabase annotation**
- **Dimensioning**

Maplex

- **Using Maplex**
- **Label positioning**
- **Stacked labels**
- **Abbreviation dictionaries**

Prerequisites

Students should be familiar with the basic use of ArcGIS, including the topics covered in either the *Fundamentals of ArcGIS* or *ArcGIS Desktop I* courses.

July 18-19, 2012

Editing in ArcMap

Overview

This 2-day course teaches students how to add, delete, and modify data using advanced editing techniques in ArcGIS. Students learn the fine details of editing in ArcMap, including how to use the proper combination of feature templates, construction methods, and workflows. The course introduces both map topology and geodatabase topology, and teaches students to effectively use topology

constraints to keep data clean throughout the editing process. Students will also learn how to georeference an image and trace features off the image using ArcScan.

Intended Audience

This course is for those who are comfortable with the basics of ArcGIS and want to learn how to create and edit their data.

Topics Covered

Day 1

- **Basic Editing (Creating Geodatabases and Feature Classes; Editing Workflow; Drawing New Features; Editing Attributes; Snapping; Feature Construction Toolbar; Mini-Toolbars)**
- **Editing Tools (Sketch Creation Tools; Copy and Paste; Feature Construction Tools; Construction Methods)**
- **Feature Templates (Create Features Window; Feature Template Creation; Filtering and Grouping; Searching; Managing; Sharing)**
- **Modifying Tables (Edit Attributes Manually; Edit Multiple Features; Edit Table; Field Calculator; Calculate Geometry)**

Day 2

- **Map Topology (What is Topology?; Map vs. Geodatabase Topology; Setting up a Map Topology; Using Map Topology Tools)**
- **Advanced Editing and COGO Tools (Advanced Editing Tools; COGO Tools; Editor Menu Tools; Geoprocessing Tools)**
- **Geodatabase Topology (Creating Geodatabase Topology; Properties; Validation; Errors; Fixing Errors)**
- **Working with Raster Data (Georeferencing an Image; Working with ArcScan)**

Prerequisites

Students should have knowledge of Microsoft Windows and be familiar with the basic use of ArcGIS, including topics covered in either the *Fundamentals of ArcGIS* or *ArcGIS Desktop I* courses.

July 24-25, 2012

ArcGIS Desktop III: Workflows and Analysis

Overview

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- Creating and editing metadata using a template.
- Creating custom symbols and style sheets.
- Creating and applying a custom map template.
- Running analysis tools using dialog boxes, models, and the command line window.
- Building a complex model using ModelBuilder.

Prerequisites

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August 21-23, 2012

ArcGIS Desktop II: Tools and Functionality

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- Accessing feature information in tables and control table display properties.
- Querying and analyzing GIS data.
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- Creating presentation-quality maps and graphs.

Prerequisites

Students should have completed *ArcGIS Desktop I: Getting Started with GIS* or have equivalent knowledge.

August 29-31, 2012

Python for GIS

Overview

Python is becoming more and more popular for writing custom scripts in ArcGIS. In ArcGIS 10, the command line window has been replaced with the Python window which executes true Python statements. Python scripts can be used to manipulate a map, execute geoprocessing commands, and read/write files. This three-day course teaches basic Python syntax, working with ArcPy (the Python scripting module for ArcGIS), and file manipulation.

Intended Audience

This course is for those who are comfortable with the basics of ArcGIS and want to learn how to write Python scripts to manipulate data and maps.

Topics Covered

Day 1

- **Introduction to Python: Working with the Integrated Development Environment (IDE), Using PythonWin and the Python Debugger. Basic Programming Techniques Including Setting Variables, Adding Comments, and Using the Print Statement.**
- **Modules and Decision Making: Using Conditional (if/then) Statements to Control the Flow of a Program. Comparison Operators. Built-in Functions and Modules. Getting Input from the User. Using the ArcPy Module in your Python Scripts.**
- **Lists and Looping: List Methods and Functions. Command-line Inputs. Conditional Statements. Looping. Lists and Looping with ArcPy.**
- **Geoprocessing with Python: Executing Tools with Python. A discussion of Geoprocessing Tools. Working with Pathnames. Writing a SQL Where clause in Python. Error Handling. Working with Environments.**

Day 2

- **Map Documents: Accessing a Map Document. Accessing the Data Frame. Accessing Layers. Retrieving and Setting Layer Properties.**

- **Cursors: Using Cursors to Step through Dat. Cursor Types: Search, Update and Insert. Working with the Row Object. Cursors and Data Locking. Cursor Parameters.**
- **Working with Geometry: ArcGIS Geometry. Reading and Writing Geometry. Working with the Geometry Object. Understanding Geometry types. Creating Geometry. Using Dictionaries/Hashers.**

Day 3

- **Script Tools: Custom Toolboxes. Toolbox Properties. Creating a Script Tool. Tool Parameters and Input Arguments. Sharing Tools. Creating Models and Working with Toolbox.**
- **Input and Output: Reading from and Writing Data to Text Files. Creating Log Files. Converting Data Types. Creating Python Objects with the Pickle Modules. Formatting Strings.**
- **Regular Expressions: Using Regular Expressions to Search through Text Strings. Regular Expression Characters and Matches. Case Insensitive Searches. Search/Replace Functions. Memory Searches. Commenting.**

Prerequisites

Students should have knowledge of Microsoft Windows and be familiar with the basic use of ArcGIS, including the topics covered in either the *Fundamentals of ArcGIS* or *ArcGIS Desktop I* courses.

Courses offered earlier in the year, now closed

November 15-17, 2011

GIS Programming 101: Mastering Python

Overview

This course is designed to teach the fundamental programming constructs of the Python language and how it can be integrated with ArcGIS Desktop to automate geoprocessing tasks.

Intended Audience

This course is geared toward all levels of GIS professionals who need to automate ArcGIS geoprocessing tasks. No programming experience is necessary though it is helpful to have some knowledge and/or experience with programming concepts.

Topics Covered

- Python language fundamentals.
- Reading and using the Geoprocessor Object Model Diagram in scripting tasks.
- Using the PythonWin integrated development environment.
- Integrating ArcToolbox and custom tools into your Python geoprocessing scripts.
- Retrieving and creating messages from the Geoprocessor.
- Graceful handling of errors in your scripts.
- Obtaining descriptive information about your GIS data.
- Searching for data in your feature classes and tables.
- Inserting, updating, and deleting data from feature classes and tables.
- Reading and writing feature geometry in feature classes.
- Creating lists of data in your script for further geoprocessing.
- Creating custom script tools that can be integrated with ArcToolbox and shared with others in your organization.
- Schedule scripts to run after hours.
- Obtaining historical geoprocessing information.

Prerequisites

Students should have knowledge of ArcGIS and have taken *ArcGIS Desktop III: Workflows and Analysis* or equivalent knowledge and experience. Some

programming experience is a plus; however the course provides a foundation for the beginning programmer.