

# **Geodatabase Management Pathway**

# Table of Contents

|   |           |
|---|-----------|
| <b>ArcGIS Desktop II: Tools and Functionality</b>                       | <b>3</b>  |
| <b>ArcGIS Desktop III: GIS Workflows and Analysis</b>                   | <b>6</b>  |
| <b>Building Geodatabases</b>  | <b>8</b>  |
| <b>Data Management in the Multiuser Geodatabase</b>                     | <b>10</b> |
| <b>Introduction to the Multiuser Geodatabase</b>                        | <b>12</b> |
| <b>ArcGIS Server Enterprise Configuration and Tuning for Oracle</b>     | <b>15</b> |
| <b>ArcGIS Server Enterprise Configuration and Tuning for SQL Server</b> | <b>18</b> |
| <b>Geodatabase Design Concepts</b>                                      | <b>20</b> |
| <b>Managing Editing Workflows in a Multiuser Geodatabase</b>            | <b>23</b> |

# ArcGIS Desktop II: Tools and Functionality

3 days (24 hours)

Authored by ESRI

## ▼Overview

*This course is part of the [ArcGIS Desktop 9.3 Foundational Training Curriculum](#). The ArcGIS 9.2 version of this course was titled *Introduction to ArcGIS I*.*

ArcGIS Desktop software is 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 (the primary applications included with ArcGIS Desktop software) to perform common GIS tasks and workflows. The tools for creating and managing geographic data, displaying data on maps in different ways, and combining and analyzing data to discover patterns and relationships are highlighted, and you learn how ArcGIS Desktop provides a complete GIS software solution. By the end of the course, you will be prepared to start working with the software on your own.

## ▼Who Should Attend

This course is designed for those with an education in or workplace experience with GIS but no ArcGIS software experience. This course assumes knowledge of basic GIS concepts. This course teaches the skills and knowledge needed to take other ArcGIS courses, including [ArcGIS Desktop III: GIS Workflows and Analysis](#).

## ▼Goals

Those who complete this course will be able to

- List common GIS tasks and identify which ArcGIS Desktop application is used for each task.
- Understand what the geodatabase offers for GIS data storage.
- Create and edit geodatabase features.
- Control the appearance and display of data layers in ArcMap.
- Classify and symbolize map data.
- Label map features.
- Change the coordinate system and map projection used to display a dataset.

- Access feature information in tables and control table display properties.
- Query and analyze GIS data.
- Create presentation-quality maps and graphs.

▼ **Topics Covered** [Table of Contents](#) [PDF 25kb]

- Investigating geographic data: How geographic data is stored; Vector and raster data; Geodatabase basics and advantages; Shapefiles; Coverages; CAD data; Managing data in ArcCatalog; Displaying data in ArcMap; ArcMap basics; Data and layers.
- Managing map layers: Zooming to layers; Bookmarks; Display windows; Scale ranges; Group layers; Selection layers; Layer files; Creating hyperlinks.
- Symbolizing categorical data: Symbology; Choosing symbology; Types of symbols (marker, line, fill); Creating symbols.
- Symbolizing quantitative data: Symbology options (graduated colors, graduated symbols, proportional symbols, dot density, charts); Classification methods (Natural Breaks, Equal Interval, Quantile, Manual); Excluding data from a classification; Rendering raster data.
- Labeling map features: Label placement for different feature types (points, lines, polygons); Label symbology; Controlling label display using scale range and SQL query; Label classes; Label expressions; Label ranks and weights; What is annotation?; Geodatabase annotation; Map annotation.
- Using coordinate systems and map projections: What is a coordinate system?; Geographic coordinate systems; Datums; Projected coordinate systems; Map projections; Feature classes and coordinate systems; Data frames and coordinate systems; Geographic transformations; Working with an unknown coordinate system; Projecting data; Defining a projection.
- Making a map layout: Working in layout view; Tools for arranging map elements; Data frame properties for layouts; Adding legends, scale bars, and other map elements; Exporting maps; Working with map templates.
- Managing tables: Table structure; Layer attribute tables; Nonspatial tables; Getting information from tables; Field properties; Table appearance; Creating graphs and reports; Connecting tables using joins and relates; Cardinality.
- Editing features and attributes: Reasons to edit data; Working with the Editor toolbar; Edit sketches; Common editing tools; Edit tasks; Snapping to features while editing; Editing attributes; Calculating values for geometry fields; Working with coincident geometry in a map topology; Typical editing workflow.

- Creating geodatabases and feature classes: Types of geodatabases; Geodatabase organization; Feature class organization; Feature class properties and attributes; Metadata; Creating, viewing, and editing metadata; Importing and exporting metadata; Creating features in a new feature class.
- Getting locations from attributes: Adding x,y coordinate data; Finding places and addresses; Finding routes and nearby places; Geocoding; Geocoding components (address table, address locator, reference data); Address matching overview; Geocoding workflow; Reference data sources.
- Solving spatial problems with query and analysis: GIS analysis basics; Typical analysis workflow; Common analysis operations (attribute and spatial queries, clipping data from layers, buffering features, overlaying features); Overview of geoprocessing; Analysis results.
- Customizing ArcGIS Desktop: Why customize the interface?; Customize dialog box; Locating commands; Adding new toolbars, commands, and menus; Saving customizations; Saving to a template; Storing templates.

#### ▼Prerequisites

Students should have completed [ArcGIS Desktop I: Getting Started with GIS](#) or [Getting Started with GIS](#) or have equivalent knowledge.

#### ▼Software Used in Course

This course is designed to work with the following software:

| <b>ArcGIS Desktop*</b> | <b>Version</b> |
|------------------------|----------------|
| ArcEditor              | 9.3            |
| ArcInfo                | 9.3            |
| ArcView                | 9.3            |

\*Only one of the listed licenses will be used in the classroom.

# ArcGIS Desktop III: GIS Workflows and Analysis

2 days (16 hours)

Authored by ESRI

## ▼Overview

This course is part of the [ArcGIS Desktop 9.3 Foundational Training Curriculum](#). The ArcGIS 9.2 version of this course was titled *Introduction to ArcGIS II*.

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.

## ▼Who Should Attend

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.

## ▼Goals

Those completing this course will be able to

- Add data from different sources to a geodatabase.
- Work with subtypes to edit data.
- Edit and validate feature geometry and attributes using geodatabase topology.
- Run analysis tools using dialog boxes and models.
- Build a complex model using ModelBuilder.

## ▼Topics Covered [Table of Contents](#) [PDF 21kb]

- Getting data into the geodatabase: Advantages of migrating data to the geodatabase; File and personal geodatabases; Loading and importing data; Data sources available for conversion; ArcToolbox conversion tools; Importing and exporting data in ArcCatalog; Importing and exporting data using XML; Copying and pasting data between geodatabases; Batch and single conversions; Loading data into existing feature classes using the Simple Data Loader; Displaying x,y coordinate data from a table; Accessing

tabular data using an OLE DB connection; Adding data from a GIS server; Working with map projections and datums.

- Geodatabase behavior: What is behavior?; Advantages of using behaviors; Default values; Subtypes; Domains; Geodatabase topology.
- Editing GIS data: Creating new data (digitizing, copying and pasting features, Editor menu commands); Constructing an edit sketch using constraints (direction, length, parallel); Creating adjacent polygons using the Auto-Complete Polygon task; Modifying existing features; Reshaping existing features and boundaries; Exploding multipart features; Editing using domains, subtypes, and topology.
- Aligning spatial data: Common data alignment problems; Georeferencing CAD data; Matching layer boundaries; Transformation; Rubber sheeting; RMS error.
- Managing geoprocessing tools and settings: Types of toolboxes and how they are stored; Types of tools (system tools, models, scripts); Locating tools in ArcToolbox; Executing tools; Tool parameters; Parameter error detection; Environment settings; Tool layers; Geoprocessing results.
- Analyzing GIS data: Review of common analysis tools (Buffer, Clip, Intersect, Select, Union); Working with feature proximity tools (Near, Spatial Join, Multiple Ring Buffer, Create Thiessen Polygons); Analyzing tabular data; Creating a raster subset; Analysis options outside of core ArcGIS Desktop; Typical analysis workflow.
- Using ModelBuilder for analysis: Working with ModelBuilder; Creating and designing models; Model elements (tools and variables); Setting general model properties; Setting model parameters; Environment settings; Intermediate data; Running and troubleshooting a model; Creating model documentation.
- GIS analysis projects: Real-world GIS analysis projects (Find the best site for a new shelter, Find the mileage of flooded roads); The analytical process for each project.

### ▼Prerequisites

Students should have completed [ArcGIS Desktop II: Tools and Functionality](#) or [Learning ArcGIS Desktop](#) or have equivalent knowledge.

### ▼Software Used in Course

This course is designed to work with the following software:

| <b>ArcGIS Desktop</b> | <b>Version</b> |
|-----------------------|----------------|
| ArcInfo               | 9.3            |

# Building Geodatabases

3 days (24 hours)

Authored by ESRI

## ▼ Overview

This course provides an overview of the structure and capabilities of the geodatabase. You learn how to create a geodatabase, migrate existing GIS data to a geodatabase, and edit and maintain data stored in a geodatabase. The course covers some advanced geodatabase topics including how to build a geodatabase topology; maintain data integrity using subtypes, attribute domains, and relationship classes; and create a geodatabase schema. In course exercises, you work with the file geodatabase and learn how to migrate personal geodatabase data to a file geodatabase and create various geodatabase components.

## ▼ Who Should Attend

This course is designed for experienced ArcGIS users who want to store data in a geodatabase and take advantage of advanced geodatabase functionality. Data managers will find this course of particular benefit. Those who will be working with a multiuser geodatabase may also wish to enroll in [Introduction to the Multiuser Geodatabase](#), which pairs well with this course.

## ▼ Goals

Those completing this course will be able to

- Understand the geodatabase structure.
- Explain advantages of a file geodatabase.
- Understand advantages of geodatabase validation rules.
- Load vector and raster data into a geodatabase.
- Create and apply attribute domains, subtypes, and relationship classes.
- Edit data using attribute domains, subtypes, and relationship classes.
- Create and edit geodatabase annotation.
- Create geodatabase topology and apply topology rules.
- Edit topological data.
- Perform geometric network editing and tracing.

## ▼ Topics Covered [Table of Contents](#) [PDF 24kb]

- Introduction to the geodatabase: Advantages of the geodatabase; Focusing on the file geodatabase; Overview of elements within the geodatabase; Geodatabase tables in a database management system (DBMS).
- Attribute validation rules: Subtypes and domains; Creating subtypes; Editing subtypes in ArcMap; Creating domains; Editing with domains in ArcMap; Coded value versus. range domains; Subtypes and relationship rules.
- Relationship classes: Creating relationship classes; Setting relationship class properties; Using relationships in ArcMap; Relationship rules; Validation; Simple versus. composite relationships.
- Annotation: Creating, editing, and managing annotation features in the geodatabase.
- Geodatabase topology: Topology management in the geodatabase; Building a topology; Setting the properties of a topology; Setting appropriate topological rules; Fixing topological errors; Editing topological data.
- Geometric networks: Creating and editing geometric networks; Performing analysis; Setting and using connectivity rules.
- Building geodatabase schema: Different ways to define geodatabase schema; Creating tables, feature classes, and feature datasets.
- XML data interchange: Understanding XML schemas of the geodatabase; Exporting the contents of a geodatabase to XML; Importing an XML file into a geodatabase.
- Vector data in the geodatabase: Loading data from shapefiles, CAD files, coverages, and Excel spreadsheets; Using ArcGIS vector data loading tools.
- Raster data in the geodatabase: Storing raster datasets, raster catalogs, and raster attributes in the geodatabase.

#### ▼Prerequisites

Students should have completed [ArcGIS Desktop II: Tools and Functionality](#) or [Learning ArcGIS Desktop](#) or have equivalent knowledge.

#### ▼Software Used in Course

This course is designed to work with the following software:

| <b>ArcGIS Desktop*</b> | <b>Version</b> |
|------------------------|----------------|
| ArcEditor              | 9.3            |
| ArcInfo                | 9.3            |

\*Only one of the listed licenses will be used in the classroom.

# Data Management in the Multiuser Geodatabase

3 days (24 hours)

Authored by ESRI

## ▼Overview

ArcSDE technology is an integrated part of ArcGIS Server and is used to access multiuser geographic databases stored in relational database management systems (RDBMS). This course prepares GIS and database administrators to implement an ArcSDE geodatabase by teaching how to load and manage ArcSDE data. The course presents concepts applicable to both workgroup and enterprise ArcSDE geodatabases but focuses primarily on the enterprise ArcSDE geodatabase. You learn the basic architecture of a multiuser geodatabase and are introduced to ArcSDE connection types. The course focuses on loading and managing vector and raster data and emphasizes best practices for interacting with a multiuser geodatabase. You explore multiuser geodatabase design strategies and editing options for data stored in a multiuser geodatabase, including versioning.

## ▼Who Should Attend

This course is designed for GIS and database administrators who want to implement a workgroup or enterprise ArcSDE geodatabase. This course pairs well with the [ArcGIS Server Enterprise Configuration and Tuning for Oracle](#) and [ArcGIS Server Enterprise Configuration and Tuning for SQL Server](#) courses.

## ▼Goals

Those completing this course will be able to

- Describe the multiuser geodatabase architecture.
- Create connections to an enterprise ArcSDE geodatabase.
- Understand and manage user permissions.
- Design, load, and manage vector and raster data.
- Describe client optimization practices.
- Understand editing options in a multiuser geodatabase.
- Understand the basic architecture and workflow of multiuser editing.

## ▼Topics Covered [Table of Contents](#) [PDF 25kb]

- Defining geodatabase architecture: Multitier architecture; Geodatabase options; Elements of a workgroup and enterprise installation.
- Geodatabase administration: User roles and privileges; Management tools.
- Connecting to the geodatabase: Direct and application server connections; OLE DB connections.
- Data loading and management: Configuring dbtune parameters for spatial data storage; Tools for data creation; Vector storage; Raster storage and organization; Managing spatial and attribute indexes; Associating spatial and non spatial data; Geodatabase design considerations.
- Multiuser editing: Overview of available options; Versioning concepts including reconcile, post, and conflict detection.
- Maintaining performance: Compressing the geodatabase; Recommendations for maintaining performance; Tips and tricks for data managers.

#### ▼Prerequisites

Students should have completed [ArcGIS Desktop II: Tools and Functionality](#) or [Learning ArcGIS Desktop](#) or have equivalent knowledge. Students should also be familiar with basic RDBMS concepts.

#### ▼Software Used in Course

This course is designed to work with the following software:

| <b>ArcGIS Desktop</b> | <b>Version</b> |
|-----------------------|----------------|
| ArcInfo               | 9.3            |

  

| <b>ArcGIS Server*</b>          | <b>Version</b> |
|--------------------------------|----------------|
| ArcGIS Server Basic Edition    | 9.3            |
| ArcGIS Server Standard Edition | 9.3            |
| ArcGIS Server Advanced Edition | 9.3            |

\*Only one of the listed licenses will be used in the classroom.

| <b>Other</b>         | <b>Version</b>  |
|----------------------|-----------------|
| Microsoft SQL Server | 2005 or Express |

# Introduction to the Multiuser Geodatabase

2 days (16 hours)

Authored by ESRI

## ▼Overview

The multiuser geodatabase uses ArcSDE technology and a relational database management system (RDBMS) to store large amounts of GIS data that many users may concurrently access. This course, designed for the end user of a multiuser geodatabase, shows how to leverage the powerful capabilities offered by the multiuser geodatabase. You learn how to perform GIS tasks in a multiuser environment and how the multiuser environment differs from the file geodatabase or personal geodatabase for Microsoft® Access™ environment. The course also discusses geodatabase functionality in the context of an editing environment, fundamental editing workflow procedures, and clientside performance considerations. This course does not focus on a specific supported RDBMS and is suitable for those working with desktop, workgroup, and enterprise ArcSDE geodatabases.

## ▼Who Should Attend

This course is designed for experienced ArcGIS users who are familiar with the geodatabase data model and are migrating to a multiuser geodatabase environment. GIS managers will also find the course a useful introduction to the capabilities and uses of a multiuser geodatabase. Those who want to learn how to create the structure of a geodatabase and add "smart" features such as subtypes, domains, and relationship classes, may wish to enroll in [Building Geodatabases](#), which pairs well with this course.

## ▼Goals

Those completing this course will be able to

- Describe advantages of working with a multiuser geodatabase.
- Understand the differences between desktop, workgroup, and enterprise geodatabases.
- Understand properties of geodatabase connections.
- Examine vector and raster data in a multiuser geodatabase.
- Optimize the performance of client applications.
- Edit data stored in a multiuser geodatabase.
- Understand fundamental concepts of versioning workflow procedures.
- Perform checkout/check-in geodatabase replication for editing.

▼ **Topics Covered** [Table of Contents](#) [PDF 23kb]

- Geodatabase basics: Overview of geodatabase types; Advantages of ArcSDE geodatabases; ArcSDE geodatabases: desktop, workgroup, and enterprise.
- Exploring and connecting to the geodatabase: Application server, direct, and OLE DB connections.
- Exploring geodatabase components: Moving data between geodatabases; Vector and raster data properties; Granting privileges on data.
- Optimizing clientside performance: Performance tips for working with multiuser geodatabases in ArcCatalog and ArcMap.
- Non-versioned editing: Understanding and performing non-versioned editing; Concurrency issues.
- Versioned editing: Working with versions; Version properties and permissions; Multiuser editing in one version and conflicts; Merging versions: reconcile, post, and conflicts.
- Geodatabase replication: Overview of replica types: checkout/check-in, one-way, and two-way; Understanding and performing checkout/check-in replication.

▼ **Prerequisites**

Students should have completed [ArcGIS Desktop II: Tools and Functionality](#) or [Learning ArcGIS Desktop](#) and [ArcGIS Desktop III: GIS Workflows and Analysis](#) or have equivalent knowledge. Database administration experience is *not* required.

▼ **Software Used in Course**

This course is designed to work with the following software:

| <b>ArcGIS Desktop*</b> | <b>Version</b> |
|------------------------|----------------|
| ArcEditor              | 9.3            |
| ArcInfo                | 9.3            |

\*Only one of the listed licenses will be used in the classroom.

| <b>ArcGIS Server*</b>          | <b>Version</b> |
|--------------------------------|----------------|
| ArcGIS Server Advanced Edition | 9.3            |
| ArcGIS Server Basic Edition    | 9.3            |

ArcGIS Server Standard Edition

9.3

\*Only one of the listed licenses will be used in the classroom.

**Other**

**Version**

ArcSDE

9.3

Microsoft SQL Server

2005 or Express

# ArcGIS Server Enterprise Configuration and Tuning for Oracle

2 days (16 hours)

Authored by ESRI

## ▼Overview

ArcGIS Server includes ArcSDE technology, a server-side software product that acts as the GIS gateway to spatial data stored in relational database management systems (RDBMS). It is an integrated part of ArcGIS and a core element of any enterprise GIS solution. This course prepares Oracle database administrators to implement an enterprise geodatabase by teaching how to build an individual ArcSDE server. You get familiar with the ArcSDE architecture and learn how to configure Oracle to support ArcSDE, install and configure ArcSDE, and identify and troubleshoot connection types and issues. The course emphasizes the importance of managing storage settings for loading vector and raster data and teaches techniques for maintaining geodatabase performance in an editing environment. Additionally, the course explains how ArcSDE interacts with Oracle databases and presents solid strategies for maintaining and managing an enterprise geodatabase.

## ▼Who Should Attend

This course is designed for experienced Oracle database administrators who need to understand how to install and configure an enterprise geodatabase and how to manage a multiuser editing environment. You may choose to also enroll in [Data Management in the Multiuser Geodatabase](#), which complements this course.

## ▼Goals

Those completing this course will be able to

- Configure Oracle to support ArcSDE.
- Install and configure ArcSDE.
- Create multiple ArcSDE workspaces.
- Customize storage for spatial data.
- Configure, create, and monitor connections.
- Implement data management strategies for vector and raster data.
- Optimize ArcSDE.
- Maintain performance of a multiuser geodatabase.
-

▼ **Topics Covered** [Table of Contents](#) [PDF 139kb]

- ArcSDE installation: Evaluating the Oracle server configuration; Preparing Oracle to use ArcSDE; Installing ArcSDE; Starting and stopping the ArcSDE server; Exploring ArcSDE system tables.
- Data loading: Creating storage space; Creating users and assigning privileges; Creating vector feature classes; Creating raster datasets; Examining feature class components; Customizing storage with the DBTUNE table; Integrating the new ST\_GEOMETRY Spatial Type.
- Monitoring data access: Creating application server and direct connections; Monitoring connections with ArcSDE and Oracle tools; Managing multiple geodatabases in one Oracle instance.
- Editing in a nonversioned environment and managing a multiversioned geodatabase: Registering feature classes as versioned; Compressing the geodatabase; Monitoring changes to the adds, deletes, and system tables.

▼ **Prerequisites**

Students should have experience with Oracle database administration or application development. Although these courses are not required, students will benefit from completion of [ArcGIS Desktop II: Tools and Functionality](#), [ArcGIS Desktop III: GIS Workflows and Analysis](#), or [Building Geodatabases](#).

▼ **Software Used in Course**

This course is designed to work with the following software:

| <b>ArcGIS Desktop*</b> | <b>Version</b> |
|------------------------|----------------|
| ArcEditor              | 9.3            |
| ArcInfo                | 9.3            |

\*Only one of the listed licenses will be used in the classroom.

| <b>ArcGIS Server*</b>          | <b>Version</b> |
|--------------------------------|----------------|
| ArcGIS Server Advanced Edition | 9.3            |
| ArcGIS Server Basic Edition    | 9.3            |

ArcGIS Server Standard Edition

9.3

\*Only one of the listed licenses will be used in the classroom.

**Other**

**Version**

Oracle

10g

# ArcGIS Server Enterprise Configuration and Tuning for SQL Server

2 days (16 hours)

Authored by ESRI

## ▼Overview

ArcGIS Server includes ArcSDE technology, a server-side software product that acts as the GIS gateway to spatial data stored in relational database management systems (RDBMS). It is an integrated part of ArcGIS and a core element of any enterprise GIS solution. This course prepares Microsoft® SQL Server® database administrators to implement an enterprise geodatabase by teaching how to set up an individual ArcSDE server. You get familiar with the ArcSDE architecture and learn how to configure SQL Server to support ArcSDE, install and configure ArcSDE, and identify and troubleshoot connection types and issues. The course emphasizes the importance of managing storage settings for loading vector and raster data and teaches techniques for maintaining geodatabase performance in an editing environment. Additionally, the course explains how ArcSDE interacts with SQL Server databases and presents solid strategies for maintaining and managing an enterprise geodatabase.

## ▼Who Should Attend

This course is designed for experienced SQL Server database administrators who need to understand how to install and configure an enterprise geodatabase. You may choose to also enroll in [Data Management in the Multiuser Geodatabase](#), which complements this course.

## ▼Goals

Those completing this course will be able to

- Configure SQL Server to support ArcSDE.
- Install and configure ArcSDE.
- Customize storage for spatial data.
- Configure, create, and monitor connections.
- Implement data management strategies for vector and raster data.
- Optimize ArcSDE.
- Maintain performance of an enterprise geodatabase.

▼ **Topics Covered** [Table of Contents](#) [PDF 138kb]

- ArcSDE installation: Evaluating the configuration of SQL Server; Preparing SQL Server to use ArcSDE technology; Installing ArcSDE; Starting and stopping the ArcSDE server; Exploring ArcSDE system tables.
- Data loading: Creating storage space; Creating users and assigning privileges; Creating vector feature classes; Creating raster datasets; Examining feature class components; Customizing storage with the DBTUNE table.
- Monitoring data access: Creating application server and direct connections; Monitoring connections with ArcSDE and SQL Server tools.
- Editing in a nonversioned environment and managing a multiversioned geodatabase: Registering feature classes as versioned; Compressing the geodatabase; Monitoring changes to the adds, deletes, and system tables.

▼ **Prerequisites**

Students should have experience with SQL Server database administration or application development. Although these courses are not required, students will benefit from completion of [ArcGIS Desktop II: Tools and Functionality](#), [ArcGIS Desktop III: GIS Workflows and Analysis](#), or [Building Geodatabases](#).

▼ **Software Used in Course**

This course is designed to work with the following software:

| <b>ArcGIS Desktop*</b> | <b>Version</b> |
|------------------------|----------------|
| ArcEditor              | 9.3            |
| ArcInfo                | 9.3            |

\*Only one of the listed licenses will be used in the classroom.

| <b>ArcGIS Server*</b>          | <b>Version</b> |
|--------------------------------|----------------|
| ArcGIS Server Advanced Edition | 9.3            |
| ArcGIS Server Basic Edition    | 9.3            |
| ArcGIS Server Standard Edition | 9.3            |

\*Only one of the listed licenses will be used in the classroom.

| <b>Other</b>         | <b>Version</b> |
|----------------------|----------------|
| Microsoft SQL Server | 2005           |

# Geodatabase Design Concepts

2 days (16 hours)

Authored by ESRI

## ▼Overview

A well-planned and efficient design is critical to the success of a geodatabase implementation. This course explains the steps involved in the geodatabase design process, from preliminary planning to schema creation. You learn how to take advantage of existing ArcGIS data models and become familiar with data modeling techniques. A review of basic geodatabase concepts is included.

## ▼Who Should Attend

This course is designed for GIS data modelers, database designers, and analysts who are experienced ArcGIS users.

## ▼Goals

Those completing this course will be able to

- Understand the structure and features of a geodatabase.
- Define a project and conduct a geodatabase needs assessment.
- Explore data and data models.
- Understand the geodatabase design process.
- Create a conceptual model for a geodatabase.
- Build a logical data model for a geodatabase.
- Build a geodatabase schema.
- Test the model and deliver a geodatabase.

## ▼Topics Covered [Table of Contents](#) [PDF 4466kb]

- Introduction to the geodatabase: Background information on geodatabase capabilities and advantages; Storage options; Geodatabase elements; Behavior in the geodatabase.
- Overview of geodatabase design: What to expect at each phase; Overview of Inception phase; Overview of Elaboration phase; Overview of Construction phase; Overview of Transition phase.

- Building the conceptual model: Identifying concepts from the Inception phase; Diagramming the conceptual model; Recognizing crucial data layers, attributes, and their associations.
- Layers and attributes in the logical data model: Mapping thematic layers to elements of the geodatabase; Defining properties for each table; Choosing geometry for feature classes; Designing and diagramming attributes and attribute properties; Determining and diagramming attribute domains; Grouping features into feature datasets or by subtype.
- Relationships in the logical data model: Normalization; Implementing associations; Relationship classes; Modeling relationships; Relationship properties and cardinality; Attributed relationships; Simple vs. composite relationships; Messaging and relationships; Relationships and subtypes; Modeling relationship rules; ArcMap joins and relates vs. relationship classes; Diagramming relationships.
- Geometric networks and topology in the logical data model: Introducing geometric networks; Investigating complex features and network weights; Defining connectivity rules; Diagramming geometric network; Diagramming edge-to-junction and edge-to-edge connectivity rules; Topology in the geodatabase; Examining topology rules; Diagramming topology; Geodatabase topology vs. map topology.
- The physical data model: Ways to build geodatabase schema; Building schema with CASE tools; Building schema by importing existing data; Creating new geodatabase elements in using ArcCatalog wizards; Sharing and editing schema with the Geodatabase Designer; CASE tools vs. ArcCatalog.
- From design to geodatabase: Outline construction and transition phases; Determining data automation method and considerations; Data loading options; Testing the geodatabase design in a pilot study; Choosing a pilot area; Documenting the pilot project; Managing metadata; Project tracking.

#### ▼Prerequisites

Students should have completed [ArcGIS Desktop II: Tools and Functionality](#) or [Learning ArcGIS Desktop](#) and [ArcGIS Desktop III: GIS Workflows and Analysis](#) or have equivalent knowledge.

#### ▼Software Used in Course

This course is designed to work with the following software:

**ArcGIS Desktop\*****Version**

ArcEditor

9.3

ArcInfo

9.3

\*Only one of the listed licenses will be used in the classroom.

# Managing Editing Workflows in a Multiuser Geodatabase

3 days (24 hours)

Authored by ESRI

## ▼ Overview

When deploying a multiuser geodatabase, the editing workflow that is administered can mean the difference between success and failure. This course provides an insider's look at how to manage editing workflows in a multiuser geodatabase. You learn how to use the different editing environments and integrate these environments into their business workflow. Additionally, you learn how ArcSDE technology implements versioned and non-versioned editing through the use of geodatabase system metadata tables and user delta tables. Solid strategies for maintaining multiuser geodatabase performance are explored.

## ▼ Who Should Attend

This course is designed for ArcSDE users and experienced ArcGIS users who want to learn how to manage their editing environment in a multiuser geodatabase. This course is suitable for those working with desktop, workgroup, and enterprise geodatabases.

## ▼ Goals

Those completing this course will be able to

- Understand the importance of designing an editing workflow.
- Edit data in a non-versioned and versioned environment.
- Discuss and implement various editing workflows.
- Understand ArcSDE system tables and user delta tables.
- Understand how to manage multiple versions.
- Use geodatabase archiving.
- Describe geodatabase replication.
- Create and use multiversioned views.
- Monitor versioned geodatabase performance.
- Understand and implement techniques for maintaining performance.

## ▼ Topics Covered [Table of Contents](#) [PDF 142kb]

- Overview of editing workflow options: Introducing the concept of short and long transactions; Overview of non-versioned editing; Overview of versioned editing.

- Workflow strategies: Editing options; Understanding workflow considerations; Overview of different workflow strategies. Non-versioned editing: Understanding non-versioned editing; Exploring concurrency issues; Examining DBMS locking; Exploring DBMS blocking issues; Workflow considerations; DBMS integrity constraints.
- Versioned editing architecture: Tracking and merging changes; Where and how changes are stored; Registering feature classes as versioned; Geodatabase user and system tables participating in the version model.
- State tree: States and the state tree; Editing examples and growth of the tables; Single-user editing example and the state tree; Multiuser editing example and the state tree; Auto-reconcile options. Merging versions: Implicit and explicit reconcile; Describing the reconcile action; Reconcile and the state tree; Conflict detection options; Conflict resolution; Reviewing conflicts; Describing the post action; Post and the state tree.
- Version workflow: Version scenarios and considerations; Workflow examples; Developing version hierarchy; QA/QC, security, design, and editing stages; Potential reconcile and post issues.
- Move to base editing: Architecture of move to base; How to register with move to base; Understanding the user tables; Move to base and the state tree; Move to base and conflict detection.
- Geodatabase archiving: Preserving change to the data; Common historical queries; History pre 9.2; Archiving overview; Architecture of geodatabase archiving; Archive time; Answering common historical questions; Workflow benefits and considerations.
- Geodatabase replication: Workflow requirements; Overview of geodatabase replication; Understanding check out/check in; One-way and two-way replication; Exploring synchronization.
- Implementing views: Overview of multiversions views; Creating a multiversions view; How to use a multiversions view; Workflow considerations.
- Bulk editing and loading: Understanding bulk change; Describing bulk change and the state tree; Workflow recommendations.
- Management and performance: Contributing factors to decreased performance; Compressing the database; Statistics and indexes.

### ▼ Prerequisites

Students should have completed [ArcGIS Desktop II: Tools and Functionality](#) or [Learning ArcGIS Desktop](#) or have equivalent knowledge. Familiarity with ArcSDE architecture and working on a Windows platform is also required.

## ▼Software Used in Course

This course is designed to work with the following software:

| <b>ArcGIS Desktop*</b> | <b>Version</b> |
|------------------------|----------------|
| ArcEditor              | 9.3            |
| ArcInfo                | 9.3            |

\*Only one of the listed licenses will be used in the classroom.

| <b>ArcGIS Server*</b>          | <b>Version</b> |
|--------------------------------|----------------|
| ArcGIS Server Basic Edition    | 9.3            |
| ArcGIS Server Standard Edition | 9.3            |
| ArcGIS Server Advanced Edition | 9.3            |

\*Only one of the listed licenses will be used in the classroom.

| <b>Other</b>         | <b>Version</b>  |
|----------------------|-----------------|
| Microsoft SQL Server | 2005 or Express |