

**GIS Data Production
and
Editing Pathway**

Table of Contents

<i>ArcGIS Desktop II: Tools and Functionality</i> _____	3
ArcGIS Desktop III: GIS Workflows and Analysis _____	6
Building Geodatabases _____	8
Creating and Maintaining Metadata Using ArcGIS Desktop _____	10
Data Production and Editing Techniques _____	12
Creating and Editing Parcels with ArcGIS Desktop _____	17
Creating and Integrating Data for Natural Resource Applications _____	19
Geoprocessing Using ModelBuilder _____	21
Introduction to the Multiuser Geodatabase _____	22
Linear Referencing with ArcGIS Desktop _____	25
QA/QC for GIS Data _____	27

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:

ArcGIS Desktop*	Version
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:

ArcGIS Desktop	Version
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:

ArcGIS Desktop*	Version
ArcEditor	9.3
ArcInfo	9.3

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

Creating and Maintaining Metadata Using ArcGIS Desktop

3 modules (9 hours)

Authored by ESRI

▼Overview

Metadata, the key information that documents a dataset, has emerged as a powerful tool for safeguarding an organization's investment in spatial data. Documenting datasets allows people to efficiently find them, evaluate their usefulness for a particular project, and share them with others. This course shows how metadata supports efficient management and use of spatial data and teaches practical strategies for creating and maintaining metadata using ArcGIS Desktop software. Students learn how to write proper metadata using tools in ArcCatalog and how to automate metadata workflows using templates.

▼Who Should Attend

This course is designed for experienced ArcGIS users who work with, create, edit, or manage spatial data.

▼Goals

Those completing this course will be able to

- Describe the benefits of creating and maintaining metadata.
- Explain the advantages of adhering to a metadata standard.
- Implement an appropriate metadata standard.
- Search metadata to find datasets.
- Evaluate datasets using metadata.
- Plan metadata content.
- Write proper metadata.
- Create templates and use sample code to streamline metadata production.
- Identify various ways to share metadata.

▼Topics Covered

- Getting Started with Metadata: The value of metadata; Finding data and applying metadata standards
- Creating and Editing Metadata: Creating metadata; Planning metadata content
- Planning a Metadata Workflow: Developing a metadata workflow; Sharing your metadata

▼Prerequisites

Students should have completed [Learning ArcGIS Desktop](#) or have equivalent knowledge.

▼Software Required

To complete course exercises, you need the following software:

ArcGIS Desktop*	Version
ArcView	9.1, 9.2 or 9.3
ArcEditor	9.1, 9.2 or 9.3
ArcInfo	9.1, 9.2 or 9.3

*Only one product in this category is required.

Data Production and Editing Techniques

3 days (24 hours)

Authored by ESRI

▼Overview

Intended for the GIS technician, this course teaches the software skills and concepts needed to automate and maintain feature data in an ArcGIS geodatabase. Using the tools available with ArcGIS software, you learn techniques for data preparation, conversion, and editing. You also learn how topology and other geodatabase validation rules help maintain data integrity as part of an editing workflow. This course teaches practical methods for working with spatial and attribute data with an emphasis on data stored in the geodatabase. Each day concludes with a project, allowing you to apply these techniques on your own.

▼Who Should Attend

This course is designed for experienced ArcGIS users who need to create and update data. GIS technicians responsible for maintaining their organizations' geographic data holdings will find the course of particular benefit. Those who are interested in automating data creation and maintenance tasks using scripts may also wish to enroll in [Geoprocessing Using ModelBuilder](#), which pairs well with this course.

▼Goals

Those completing this course will be able to

- Convert data stored in different formats to the geodatabase format.
- Use a data workflow and editing process in ArcGIS.
- Solve common coordinate system problems.
- Create and modify features using ArcMap sketch and edit tools.
- Create and edit feature attributes and tables.
- Maintain data integrity with geodatabase rules.
- Create metadata to document datasets.

▼Topics Covered [Table of Contents](#) [PDF 45kb]

- Importing and loading data: Geodatabase data loading workflow; Evaluating source data; Preparing source data; Creating geodatabase tables and feature classes; Data loading tools; Post-loading workflow; Setting metadata.

- Correcting coordinate systems: Coordinate systems overview; Coordinate system properties; Geographic (datum) transformations; Coordinate system problems and solutions; Projection on-the-fly in ArcMap; Setting coordinate system properties in ArcMap; Projection and coordinate system transformation tools; Data integration tools.
- Spatially adjusting features: Correcting an unknown coordinate system; Spatial Adjustment tools for features; Adding links; Adjustment methods; Integrating new features; Georeferencing rasters (summary).
- Data loading project: Students independently use the skills learned in the previous lessons to correct, load and integrate several data layers into a geodatabase.
- Creating features visually: Feature creation techniques overview; Digitizing workflow; Feature geometry concepts; Board vs. heads-up digitizing; Discrete vs. Spaghetti style digitizing; Creating polygons from lines and points; Setting the edit environments.
- Creating features geometrically: Sketch tools and context menus; Feature construction; Editing environments; Choosing a sketch tool; Sketch construction constraints; Sketch construction options; Creating straight and curved segments; Centerline construction; Parallel construction; Perpendicular construction; Curve construction; Distance-Distance construction.
- Editing features: Finding geometry errors; Handling overlapping polygons; Merging and exploding multipart features; Creating and editing multipart features; Reshaping features; Merging features; Splitting features; Tracing features; Editing tips.
- Editing with map topology: Coincident and shared geometry; Topology edges and nodes; Map topology concepts; Map topology workflow; Moving nodes; Moving edges; Reshaping edges; Modifying edges; Splitting edges; Digitizing and constructing features in a map topology; Excluding features; Clipping polygons with a line buffer.
- Feature creation and editing project: Students independently use the skills learned in the previous lessons to update multiple feature classes with new features.
- Creating attributes: Feature attributes and sources; Adding during or after feature creation; Attributes editor and tables; Using defaults, subtypes, and domains; Using the Field Calculator; Transfer from a joined table, from a feature, and from a spatially joined feature class.
- Editing attributes and tables: Finding attribute errors with Validate, Summarize, queries, and visual inspection; Attribute editing tools; Using SQL in selections; Making global edits with the Field Calculator and Find & Replace; Editing attributes with Visual Basic; Adding and deleting fields; Exporting records and fields; Creating and using an attribute domain; Creating and using a relationship class with rules.

- Editing with geodatabase topology: Geodatabase topology concepts and workflow; Creating a topology with ranks and rules; Setting the cluster tolerance; Validating a topology; Errors and dirty areas; Using the Error Inspector; Fixing various topology errors.
- Data maintenance project: Students independently use the skills learned in the previous lessons to correct attribute and topology errors in a new subdivision.

▼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:

ArcGIS Desktop*	Version
ArcEditor	9.3
ArcInfo	9.3

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

Geoprocessing with ArcGIS Desktop

5 modules (15 hours)

Authored by ESRI

▼Overview

Requires ArcGIS 9.2 or 9.3.

Geoprocessing is a primary function of a GIS. ArcGIS Desktop software provides hundreds of tools for processing geographic data as well as ModelBuilder, a graphical environment for visualizing and executing workflows. This five-module course teaches practical strategies for using the ArcGIS geoprocessing framework to accomplish GIS workflows. Students work with geoprocessing tools to create and organize workspaces, prepare data for analysis, and perform GIS analysis tasks, then learn how to streamline processes using models and scripts. Students also learn how to create custom geoprocessing tools and document custom tools, scripts, and models. This course provides a solid foundation in the ArcGIS Desktop geoprocessing framework and emphasizes hands-on practice through software exercises.

▼Who Should Attend

This course is designed for experienced ArcGIS Desktop users who want to use geoprocessing tools and models in their GIS projects.

▼Goals

Those completing this course will be able to

- Set up and modify the geoprocessing environment.
- Find and run the appropriate geoprocessing tools for a variety of tasks.
- Prepare data for analysis.
- Use geoprocessing tools to create, modify, and analyze spatial data.
- Create custom geoprocessing tools and models.
- Model workflows using geoprocessing tools and ModelBuilder.
- Automate and refine geoprocesses using scripting.
- Document geoprocessing methods for reusability and sharing.

▼Topics Covered

- Getting Started with Geoprocessing: What is geoprocessing?; Geoprocessing with ArcGIS

- Data Preparation: About the lynx project; Setting up your work environment; Preparing your data for analysis
- Data Analysis: Modeling your workflow; Refining your analysis
- Getting More Out of Geoprocessing: Introduction to scripting; Using scripts in models
- Documenting Your Work: Documentation for geoprocessing; Sharing your work

▼Prerequisites

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

▼Software Required

To complete course exercises, you need the following software:

ArcGIS Desktop*	Version
ArcView	9.2 or 9.3
ArcEditor	9.2 or 9.3
ArcInfo	9.2 or 9.3

*Only one product in this category is required.

Other	Version
PythonWin	2.4 or 2.5

Creating and Editing Parcels with ArcGIS Desktop

2 days (16 hours)

Authored by ESRI

▼Overview

This course provides an introduction to storing and maintaining cadastral data in a geodatabase using COGO (Coordinate Geometry) tools in ArcGIS Desktop. You learn basic concepts of the geodatabase data model and a process for editing parcels. In course exercises, you practice displaying, symbolizing, and editing parcel data as well as entering subdivisions into existing parcels. The course also teaches how to create and modify tax map annotation.

▼Who Should Attend

This course is designed for tax mapping professionals and GIS technicians who want to maintain an accurate and up-to-date geographic representation of local cadastral data.

▼Goals

Those completing this course will be able to

- Understand the structure and capabilities of a geodatabase.
- Symbolize cadastral data.
- Create layer files.
- Set up the ArcMap editing environment.
- Create new features using COGO bearing and distance measurements.
- Adjust traverses to fit into an existing parcel framework.
- Use geodatabase topology to ensure data integrity.
- Use many of the ArcMap editing and drawing tools.
- Create and modify annotation including lot dimensions.
- Enter subdivisions.

▼Topics Covered [Table of Contents](#) [PDF 22kb]

- Introduction to the geodatabase: Data storage options; Geodatabase structures and permissions; Multiuser vs. personal geodatabase.
- Symbology and navigation: Unique values; Single symbol; Cartographic symbols; Finding features; Selecting features.

- The editing environment: Edit sessions; Snapping; Units; Task/Target; Selectable layers; Coincident features; Topology.
- The process of subdividing parcels: Entering lines; Adjusting lines; Creating polygons; Creating annotation.
- Entering closed traverses: From plats; From deeds.
- Tools overview: Copy features tool; Fillet tool; Extend tool; Trim tool; Proportion tool; Topology error inspector.
- Working with geodatabase annotation: Feature-linked annotation; Standard annotation.
- Practice entering a subdivision: COGO; Georeferencing plats; Heads-up drawing; Importing from CAD.

▼Prerequisites

Students should have completed [ArcGIS Desktop II: Tools and Functionality](#) or [Learning ArcGIS Desktop](#) or have equivalent experience. They should also be familiar with tax mapping terminology and practices.

▼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.

Creating and Integrating Data for Natural Resource Applications

4 modules (12 hours)

Authored by ESRI

▼Overview

Requires ArcGIS 9.2 or 9.3.

Frequently, the natural resource data needed for a project (such as vegetation, species locations, or watersheds) does not exist. Or, the data may exist but significant manipulation is required before it can be displayed and used for analysis in a GIS. This four-module course teaches methods for acquiring, evaluating, creating, manipulating, and integrating data in preparation for analysis and map creation. Students learn tips for assembling a high-quality database, as well as best practice approaches to data problems commonly encountered by those in the natural resource and conservation fields. In a course project, students apply the skills they've learned throughout the course.

▼Who Should Attend

This course is designed for experienced ArcGIS users who want to create and integrate vector and raster data for conservation projects or other natural resource applications.

▼Goals

Those completing this course will be able to

- Evaluate existing data.
- Assess data errors.
- Create spatial and attribute data.
- Use a hard-copy map to create new features.
- Derive new data from existing spatial data.
- Integrate data collected in the field with other sources of data.
- Interpolate raster surfaces.
- Correct data alignment problems.
- Apply basic analysis tools to combine and derive new data.

▼Topics Covered

- Data Acquisition: Understanding your data needs; Locating existing data; Data preprocessing

- Data Creation: Adding field data to ArcGIS; Paper to digital conversion; Creating new data from existing data
- Data Integration and Error Assessment: Integrating data layers; Data error
- Preliminary Data Analysis: Exploring your data; Course project: Identify a site for remote bush lodges

▼Prerequisites

Students should have completed [Learning ArcGIS Desktop](#) and [Working with Rasters in ArcGIS Desktop](#) or have equivalent knowledge.

▼Software Required

To complete course exercises, you need the following software:

ArcGIS Desktop*	Version
ArcView	9.2 or 9.3
ArcEditor	9.2 or 9.3
ArcInfo	9.2 or 9.3

*Only one product in this category is required.

ArcGIS Extensions	Version
Spatial Analyst	9.2 or 9.3

Geoprocessing Using ModelBuilder

60 minutes

Authored by ESRI

▼Overview

Geoprocessing is an essential aspect of GIS that provides the ability to analyze and process geographic data. Geoprocessing tools can be accessed in ArcGIS via dialog boxes, the command line, multipart scripts, or visual workflow models. ModelBuilder provides a graphical modeling framework for designing and implementing geoprocessing models that can include system tools, scripts, models, and data. This seminar discusses how ModelBuilder can be used to create advanced procedures and workflows.

The presenter will discuss:

- Creating, editing, and running models
- How to make models more dynamic by exposing model parameters and working with environment settings and variables
- Validating, repairing, and documenting models to share with others

This presentation applies to the following software:

ArcGIS Desktop	Version
ArcView	9.0, 9.1 or 9.2
ArcEditor	9.0, 9.1 or 9.2
ArcInfo	9.0, 9.1 or 9.2

▼Who Should Attend

This seminar is intended for ArcGIS Desktop users who want to use ModelBuilder to make their geoprocessing tasks more streamlined and efficient.

▼Prerequisites

Participants should be familiar with ArcGIS Desktop and have a basic understanding of the ArcGIS geoprocessing framework.

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:

ArcGIS Desktop*	Version
ArcEditor	9.3
ArcInfo	9.3

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

ArcGIS Server*	Version
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

Linear Referencing with ArcGIS Desktop

3 modules (9 hours)

Authored by ESRI

▼Overview

ArcGIS Desktop software supports linear referencing, a method of storing data that adds a new dimension to line features. Linear referencing extends the ability to visualize and analyze linear features such as roads, pipelines, and streams. Instead of relying solely on x,y coordinate geometry, linear referencing is based on relative positions along the line using distance or temporal measures, like miles or hours. For example, an accident that occurred at a specific milepost on a highway could be modeled with linear referencing. This course covers how to generate and display linearly referenced features in a map as well as how to incorporate them into GIS analysis.

▼Who Should Attend

This course is designed for experienced ArcGIS users who want an introduction to linear referencing.

▼Goals

Those completing this course will be able to

- Create simple routes from existing line features.
- Assign measures to routes.
- Query routes.
- Symbolize routes with hatching.
- Create a route feature class.
- Edit route features and remeasure them.
- Calibrate route measures.
- Create and overlay event tables.
- Generate route events.
- Create and edit complex routes.
- Transform route events from one measurement system to another.
- Use additional analysis techniques.

▼Topics Covered

- Introducing Linear Referencing: Routes; Symbolizing routes
- Working with Linear Referencing: Route events; Editing routes; Adding complexity to routes
- Linear Referencing Analysis: Analyzing events

▼Prerequisites

Students should have completed [Learning ArcGIS Desktop](#) and [Creating, Editing, and Managing Geodatabases for ArcGIS Desktop](#) or have equivalent knowledge.

▼Software Required

To complete course exercises, you need the following software:

ArcGIS Desktop*	Version
ArcView	9.1 or 9.2
ArcEditor	9.1 or 9.2
ArcInfo	9.1 or 9.2

*Only one product in this category is required.

QA/QC for GIS Data

2 days (16 hours)

Authored by ESRI

▼Overview

Data is the foundation of every successful GIS. To ensure a reliable foundation for their GIS, organizations should have a well-designed quality assurance (QA) plan and quality control (QC) procedures integrated with the production and maintenance of GIS data. This course covers errors and quality in GIS data and provides practical guidelines for creating a complete QA plan. Using both ArcGIS Desktop and GIS Data ReViewer software (an application included with PLTS for ArcGIS—Foundation), you learn techniques for evaluating and verifying data quality. The course focuses on QC tools and workflows that simplify many aspects of automated and visual data quality control tasks, with an eye toward ever-improving technology.

▼Who Should Attend

This course is designed for project managers, spatial data managers, and GIS technicians who will be involved in the design and implementation of QA/QC programs for vector data production and maintenance.

▼Goals

Those completing this course will be able to

- Explain the importance of QA plans and QC procedures.
- Understand issues involved in GIS data quality.
- Explain the content and practice of a QA plan.
- Identify and detect different types of errors in GIS data.
- Apply QC tools, techniques, and methodologies.
- Design an error-tracking and verification process.

▼Topics Covered

- Understanding quality and error: Definitions of QA and QC; GIS data participants; GIS data completeness, consistency, accuracy, and resolution; Sources of error in GIS data; Role of QA in GIS; Exploratory versus confirmatory error discovery; Finding errors visually in ArcMap.

- Creating a QA plan: QA plan concepts and sections; Management section; Design section; Data Assessment section; Reporting and Oversight section; Workflow for creating a QA plan; Testing with a pilot project; Writing a QA plan acceptance workflow.
- Establishing data acceptance criteria and sampling strategies: Defining acceptance criteria; Properties of acceptance criteria; Acceptance workflow; Acceptance testing categories and requirements; Data sampling strategies and methods; Sample sizes and tracking; Counting and calculating errors; Installing and using tools in the QAQC Sampling Tools toolbox.
- Designing a QC workflow: Defining participants and roles, QC tasks, and QC reporting; Single and multiple group workflows; Workflow design tips; QC reviews; Diagramming a QC workflow; QC checklists; QC reporting; Designing a QC workflow for multiple groups.
- Recording and tracking errors: Reasons for tracking errors; Staff roles and responsibilities; Stages of error recording and tracking; Steps of recording, correcting, and verifying errors; Methods of recording errors; Recording and tracking errors with ArcGIS Desktop tools; Recording and tracking errors with PLTS GIS Data ReViewer.
- Initial QC checks: Batch validation; Checking schema (names, fields, and coordinate systems); Checking attributes (missing or bad values); Checking geometry (bad geometry, slivers, small features, feature counts); Checking broken validation rules; Initial QC checks with ArcGIS Desktop tools; Initial QC checks with PLTS GIS Data ReViewer; Creating and running PLTS GIS Data ReViewer batch checks.
- Validating geometry using topology: Topology basics; Topology checks for points, lines, and polygons; PLTS Data ReViewer geometry checks; Finding and recording topology errors with ArcGIS Desktop tools; Finding and recording topology errors with PLTS GIS Data ReViewer.
- Visual review techniques: Performing visual QC; Setting symbols and labels; Labeling techniques for points, lines, and polygons; Tools and methods for visual review; Tracking and recording progress; Creating and using checkplots; Visual QC tools in PLTS GIS Data ReViewer; Visual error inspection with ArcGIS Desktop tools; Visual error inspection with PLTS GIS Data ReViewer.
- Writing a QC report and completing the QA plan: QC reporting workflow; Categorizing errors; Calculating error rates; Preparing a QC report; Acceptance criteria; Rejecting data; Setting up a problem and resolution (PAR) system; Revising the QA plan.

▼Prerequisites

Students should have completed [ArcGIS Desktop II: Tools and Functionality](#) or [Learning ArcGIS Desktop](#) or have equivalent knowledge. Completion of [Building Geodatabases](#) is recommended.

▼Software Used in Course

This course is designed to work with the following software:

ArcGIS Desktop	Version
ArcInfo	9.3

ArcGIS Extensions	Version
GIS Data ReViewer	9.3