Course Syllabus

KnowGIS 10 Training Series. Instructor: Jere Folgert

Video-based training for learning and knowing ArcGIS Desktop

Lecture 1: Effective Learning Strategies

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Lecture 11: Exploring Tables, Graphs, and Reports.

Lecture 12: Image Registration and Spatial Transformation

Lecture 13: Exploring Simple Spatial Analysis

The KnowGIS training series includes approximately 17 hours of material.

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Syllabus - KnowGIS 10 Training Course

Learning GIS and ArcGIS Desktop v10.x | Instructor: ***Jere P. Folgert***

www.KnowGIS.com

Course Description and Overview: The KnowGIS training series is an intensive, innovative, video-based course that provides participants with an understanding of the essential principles and elements of Geographic Information Systems (GIS) and ArcGIS Desktop™ software. The course includes over sixteen hours of material, twelve primary tutorials, and relevant project data. This course provides the groundwork for becoming a productive ArcGIS Desktop ™ user.

Participants learn how to use ArcMap™, ArcCatalog™, and ArcToolbox™, and explore how these applications work in concert to organize, display, analyze, and present geographic information assets. This course covers GIS concepts as well as specific components and tools in the ArcView® license of ArcGIS Desktop™. Participants learn how to organize spatial data, query a GIS database, perform selections, edit and modify spatial data, update attribute tables, perform calculations using the field calculator, design and develop a File Geodatabase, register and rectify raster images, transform vector data, project spatial data, create maps and charts, generate reports, and explore spatial analysis.

Participants learn by watching and doing.

Instructor: The course is taught by Jere P. Folgert. Mr. Jere Folgert has over twenty-one years of GIS experience, has a Master's of Science degree in GIS from the University of Edinburgh, UK, became an ESRI Certified instructor in 1999, and is the recipient of the National Science Foundation (NSF) Award: Small Business Innovation Research (SBIR) Award.

Audience: This course presents introductory and intermediate material and is designed for participants and professionals who are new to ArcGIS Desktop™ or to geographic information systems. However, it also meets the needs of a refresher course in GIS and ArcGIS Desktop™, and as a course for upgrading ArcGIS Desktop™ skills.

Goals: The goals of this course are to expose participants to the practice and use of ArcGIS Desktop™, introduce participants to the field of GIS, and help participants develop the conceptual and methodological skills necessary for working with and interrogating spatial data.

The goals of this course are as follows:

- To facilitate a participant's learning about GIS and ArcGIS Desktop™.
- To help a participant develop skills in thinking about geographic information and applying that knowledge to projects and research activities.
- To familiarize the participant with the practical and logistical issues involved in using a ArcGIS Desktop™.
- To familiarize the participant with various GIS related tasks, including the visualization of spatial features and attributes, querying of spatial features using interactive methods and logical expressions, selection of spatial features using geography and attributes, and the organization of geographic information assets.
- To help the participant develop skills to design a Geodatabase through the use of logical models.
- To facilitate a participant's learning about editing spatial data and attribute data.
- To help a participant develop skills in associating tabular data by means of joins and relates.
- To assist a participant in developing proficiency and skill in designing and producing cartographic products, graphs, and reports.
- To provide instruction on performing image registration using raster data and to provide instruction on adjusting vector data.
- To familiarize the participant with the practical and logistical issues involved in exploring spatial data by means of spatial analysis.

Lecture 1: Effective Learning Strategies

Length: *13 Minutes* 

Project Data Included: *No*

Overview: This lecture provides suggestions and strategies that have the potential to heighten student engagement and ownership in the learning process. The instructor provides techniques and strategies for learning new software applications, provides strategies for mastering concepts of GIS software and acquiring technical skills.

Lecture 2: Introduction Geographic Information Systems (GIS)

Length: *1 hour, 40 minutes*

Project Data Included: *Yes*

Overview: This lecture provides an introduction to GIS and presents concepts related to geographic information science. This lecture balances core principles of GIS with real-world examples. This lecture should be particularly useful for participants interested in learning about geographic information science, spatial referencing systems, map projections, and feature-attribute associations. Participants are not expected to have prior experience with GIS.

Topics: Topics and subjects presented in this tutorial include spatial referencing systems, map projections, feature-attribute associations, thematic layers, geographic information assets, example uses of GIS, a brief history of GIS, datums, geoids, ellipsoids, the Cartesian coordinate system, projecting data using ArcGIS Desktop™, vector data (points, lines, polylines, and polygons), the Geodatabase, ESRI Shapefiles, spatial transformations, geoprocessing tools (dissolve, buffer, union, and intersect), and spatial joins.

Lecture 3: Finding a Hidden Treasure using ArcGIS Desktop

Length: *1 hour, 14 minutes*

Project Data Included: *Yes*

Overview: This tutorial provides participants with a challenge: Locate a hidden treasure using ArcGIS Desktop™ and abstruse clues. This fast paced tutorial supports generating new spatial data, data display activities, data exploration, analytical decision making, data conversion, planning, and spatial analysis.

Topics: Topics and subjects presented in this tutorial include Georeferencing, ASCII text files, Event Layers, the Geodatabase, the cut polygon tool, the intersect tool, selecting features by attribute and by location, the measure tool, measuring offsets, digitizing, using direction and measurement systems, including the polar and north azimuth system.

Lecture 4: What is ArcGIS?

Length: *37 minutes*

Project Data Included: *No*

Overview: This lecture provides a overview of ArcGIS™. The instructor provides an summary of ArcGIS™, ArcGIS Desktop™, ArcGIS On-Line™, and ArcGIS mobile™. This modest lecture should be particularly useful for participants who are new to ArcGIS™.

Lecture 5: Exploring ArcCatalog

Length: *1 hour, 14 minutes*

Project Data: *Yes*

Overview: This tutorial provides participants with a comprehensive overview of ArcCatalog™. The instructor presents and describes the components of the interface and provides instruction on how to use ArcCatalog™ to organize, browse, define, and discover spatial data. The instructor presents and explores information on the Catalog Tree, Folder Connections, ArcInfo™ exchange files, creating a search index, ArcGIS Help, ArcGIS Online™, and metadata tools.

Lecture 6: Creating a File Geodatabase (*Part 1 of 2)*

Length: ***1 hour, 7 minutes***

Project Data Included: *Yes*

Overview: The goal of this tutorial is to create a Geodatabase using an existing repository of geographic information assets. Participants observe how ArcCatalog™ is used to pre-organize spatial assets, project or re-project spatial data to a new spatial referencing system, define the spatial referencing system of an asset, and create feature classes and feature datasets.

Lecture 7: Creating a File Geodatabase *(Part 2 of 2)*

Length: **1 hour, *33 minutes***

Project Data Included: *Yes*

Overview: The focus of this tutorial is to design and implement a file Geodatabase. The instructor begins this lecture with a discussion on modeling the real world and provides examples of how, through the use of models, participants can represent aspects of the real world in a GIS. This is considered an intermediate-level lecture and presents information on domains and subtypes.

Topics: Topics and subjects presented in this tutorial include the file Geodatabase, database relates, models, tables, keys, conceptual and physical data models, problem solving, Geodatabase design, the simple data loader, subtypes, and domains.

Lecture 8: Exploring ArcMap

Length: **1 hour, *45 minutes***

Project Data Included: *Yes*

Overview: The goal of this tutorial is to explore ArcMap™. Participants are presented with the components of the ArcMap™ interface, including the table of contents, tool bars, the data view, and layout view. The instructor provides a description of the tools and components that comprise the tool bars, provides a description of keyboard short-cuts, and presents tricks and tips for navigating though spatial data.

Topics: Topics and subjects presented in this tutorial include data frames, spatial referencing systems, the data view and layout view, selecting features, establishing and using a hyperlink, using the Goto XY command, the table of contents options, group layers, map scale, extent indicators, the effects toolbar, transparency, map packages, map layers, layer packages, and tips and tricks.

Lecture 9: Cartography and Making Maps

Length: **1 hour,** ***48 minutes***

Project Data Included: *Yes*

Overview: The purpose of this lecture is to provide an introduction to cartography and making maps using ArcGIS Desktop™. The lectures cover fundamental cartographic concepts, geographic information presentation principles, as well as map-making techniques. The instructor presents participants with a basis for making intelligent decisions concerning the interpretation and creation of maps and presents material on the principles of map design.

Topics: Topics and subjects presented in this tutorial include cartographic design, simplification, generalization, map symbols, map audience, characteristics of a good map, font styles, point size, perception of color and light, visual clarity, visual contrast, balance, visual hierarchy, spatial book marks, clipping a data frame, graduated symbols, symbol categories using unique values, labels, inserting and adjusting map elements, draft mode, color ramps, the legend wizard, the expression box, exporting maps, map templates, rotating a data frame, and the layout toolbar.

Lecture 10: Editing and Creating Data with ArcMap

Length: ***1 hour, 32 minutes***

Project Data Included: *Yes*

Overview: The objective of this tutorial is to explore the ArcMap™ editing environment. The instructor presents information on the intuitive, sketch-based editing environment and how to create and edit feature geometry and attributes. Participants observe how to inventory and map spatial features, and learn how to use ArcMap's editing environment.

Topics: Topics and subjects presented in this tutorial include editing, digitizing, the create features dialog box, feature templates, construction tools, template properties, the edit vertices tool bar, the trace tool, subtypes, the auto complete polygon tool, the freehand drawing tool, stream digitizing mode, the attribute window, the cut polygon tool, the switch selection tool bar, reshaping features, creating Bezier curves, the move to tool, the field calculator, populating fields, and the snapping environment.

Lecture 11: Exploring Tables, Graphs, and Reports.

Length: ***1 hour, 35 minutes***

Project Data Included: *Yes*

Overview: During this tutorial participants explore table properties, define new tables, add new fields to tables, populate fields with attributes, and generate graphs and reports from tables.

Topics: Topics and subjects presented in this tutorial include graphs, reports, switching selected sets, generating statistics, working with Microsoft Excel™ files and ASCII format, table joins, cardinality, one-to-one relationships, one-to-many relationships, many-to-many relationships, many-to-one relationships, relating tables, rearranging multiple fields at one time, using the field calculator with numbers, text strings, and dates, calculating the geometry of a feature, generating graphs, spatial selections, table join, the report generator, the report wizard, the document file (.rdf), the report layout file (.rlf), and tips and keyboard short cuts.

Lecture 12: Image Registration and Spatial Transformation

Length: ***1 hour, 1 minute***

Project Data Included: *Yes*

Overview: This tutorial provides instruction on how to register and rectify raster images and how to transform vector data. The instructor presents information and examples on how to add control links, view residual errors, and select a transformation method and displays the results of different applied transformation methods.

Topics: Topics and subjects presented in this tutorial include image registration, georeferencing, affine transformations, displacement links, residual error, viewing the root mean square (RMS) error, resampling techniques, image distortion, orthorectification, the rational polynomial coefficient (RPC) file, spatial adjustment, and the adjustment preview window.

Lecture 13: Exploring Spatial Analysis

Length: ***1 hour, 48 minute*** 

Project Data Included: *Yes*

Overview: During this tutorial, the instructor presents examples of spatial analysis using an ArcView® license of ArcGIS Destkop™. Participants observe methods used to perform simple spatial analysis and are presented with example techniques for analyzing spatial data.

Topics: Topics and subjects presented in this tutorial include visual analysis, spatial analysis, symbol classification, symbol categories, multivariate display, cholopleth maps, normalized cholopleth maps using area, cartograms, proximity analysis, buffer analysis, manual selections, spatial selections, dissolving features, calculating the geography units of a feature, geoprocessing operations, including union and merge, temporal data, and using the time slider window to create a time-enabled animation.

Total Run Time: Approximately 1,033 Minutes = 17.2 Hours.

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