

# **Module - GIS Part I: Assignment 1 – ArcGIS Introduction**

## **Instructions for this assignment**

Download *ArcGISIntroduction.zip* and unzip the file. Follow the instructions starting from the next page.

## **Due Date**

By midnight EST of January 29, 2023, Sunday.

## **Grading**

This assignment is worth 10 points for the 5 screenshots taken as required.

## **File naming convention for the assignment**

Save the screenshots in a Word or PDF file and use the following file naming convention:

M6\_Assignment1\_ your-first-name\_ your-last-name.doc

or

M6\_Assignment1\_ your-first-name\_ your-last-name.pdf

Be sure to use the underscores as you see in the example.

## **How to hand in the assignment**

When you have finished your assignment, you will upload (submit) it to the same assignment area where you found it. You may only submit this assignment one time. I remind you that if you do not submit the assignment before the due date, you will not be able to submit it.

1. Complete the assignment in a Word or PDF document.
2. Return to the dropbox folder for this assignment.
3. Look for the “Add a File” button in the Submit Files area.
4. Browse for the assignment that you have on your computer, and select it so that it uploads to the assignment area.
5. Click “Submit”.

## Task 1: Introduction to ArcCatalog

**What you need:** *emidalat*, an elevation raster, and *emidastrm.shp*, a stream shapefile.

Task 1 introduces ArcCatalog, an application for managing data sets.

1. Start ArcCatalog. ArcCatalog lets you set up connections to your data sources, which may reside in a folder on a local disk or a database on the network. For Task 1, you will make connection to the folder containing the ArcGISIntroduction database. Click the Connect to Folder button (it should be the second icon from the left). Navigate to the ArcGISIntroduction folder and click OK. The ArcGISIntroduction folder now appears in the Catalog tree. Expand the folder to view the data sets.
2. Click *emidalat* in the catalog tree. Click the Preview tab to view the elevation raster. **Take a screenshot.**<sup>1</sup>
3. Click *emidastrm.shp* in the Catalog tree. On the preview tab, you can preview the geography and table of *emidastrm.shp*. **Take a screenshot.**
4. ArcCatalog has tools for various data management tasks. You can access these tools by right-clicking a data set to open its context menu. Right-click *emidastrm.shp*, and the menu shows Copy, Delete, Rename, Create Layer, Export, and Properties. Using the context menu, you can copy *emidastrm.shp* and paste it to a different folder or delete it. A layer, or a layer file, is a visual representation of a data set. The export tool can export a shapefile to a geodatabase or a coverage<sup>2</sup>. The properties dialog shows the data set information.
5. This step lets you create a personal geodatabase and then import *emidalat* and *emidastrm.shp* to the geodatabase. Right-click the ArcGISIntroduction folder in the Catalog tree, point to New, and select Personal Geodatabase. Click the new geodatabase and rename it *Task1.mdb*. If the extension .mdb does not appear, select ArcCatalog Options from the Customize menu and on the General tab uncheck the box to hide file extensions.
6. There are two options for importing *emidalat* and *emidastrm.shp* to *Task1.mdb*. You will try both options. Right-click *Task1.mdb*, point to Import, and select

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<sup>1</sup> Press Alt and Print Screen to copy an active window. You can then paste the screenshot in a word document.

<sup>2</sup> A coverage is a georelational data model that stores vector data.

Raster Datasets. In the next dialog, navigate to *emidalat*, add it for the input raster, and click OK to import.

7. Now you will use the second option, ArcToolbox, to import *emidastrm.shp* to *Task1.mdb*. Select Environments from the Geoprocessing menu and set the ArcGISIntroduction database to be the current and scratch workspaces. Click the ArcToolbox Window button to open ArcToolbox. Alternatively, you can select ArcToolbox from the Geoprocessing menu. Tools in the ArcToolbox are organized into a hierarchy. The tool you need for importing *emidastrm.shp* resides in the Conversion Tools/To Geodatabase toolset. Double-click Feature Class to Feature Class to open the tool. Select *emidastrm.shp* for the input features, select *Task1.mdb* for the output location, specify *emidastrm* for the output feature class name, and click OK. Expand *Task1.mdb* to make sure that the import operations are complete. **Take a screenshot** showing *emidalat* and *emidastrm.shp* are imported to *Task1.mdb*.

Note: The number of usable tools in ArcToolbox varies depending on which version of ArcGIS you are using. Go to Help/ArcGISDesktop Help/Contents/Professional Library/Geoprocessing/Geoprocessing tool reference for detailed descriptions of various tools.

## Task 2: Introduction to ArcMap

**What you need:** *emidalat* and *emidastrm.shp* same as Task 1.

In Task 2, you will learn the basics of working with ArcMap.

1. You can start ArcMap by clicking the Launch ArcMap button in ArcCatalog or from the Programs menu. ArcMap is the main application for data display, data query, data analysis, and data output. ArcMap organizes data sets into data frames (also called maps). You open a new data frame called Layers when you launch ArcMap. Right-click Layers and select Properties. On the General tab, change the name Layers to Task 2 and click OK.
2. Next add *emidalat* and *emidastrm.shp* to Task 2. Click the Add Data button (it should be the 11th icon from the left) in ArcMap, navigate to the ArcGISIntroduction database, and select *emidalat* and *emidastrm.shp*. To select more than one data set to add, click the first data set and then click other data sets while holding down the Ctrl key. An alternative to the Add Data button is the drag-and-drop method. You can add a data set in ArcMap by dragging it from the Catalog tree and dropping it in ArcMap's view window.

3. A warning message states that one or more layers are missing spatial reference information. Click OK to dismiss the dialog. *emidastrm.shp* does not have the projection information, although it is based on the UTM coordinate system<sup>3</sup>, same as *emidalat*.
4. Both *emidastrm* and *emidalat* are highlighted in the table of contents, meaning that they are both active. You can deactivate by clicking on the empty space. The table of contents has five tabs: List By Drawing Order, List By Source, List By Visibility, List By Selection, and Options. On the List By Drawing tab, you can change the drawing order of the layers by dragging and dropping a layers up or down. The List By Source tab shows the data source of each layer.
5. The standard toolbar in ArcMap has such tools as Zoom In, Zoom Out, Pan, Select Elements, and Identify. When you hold the mouse point over a tool, a ToolTip appears in a floating box to tell you the name of the tool and a short message about the use of the tool appears at the bottom of the ArcMap window.
6. ArcMap has two views: Data View and Layout View. (The buttons for the two views are located at the bottom of the view window.) Data View is for viewing data, whereas Layout view is for viewing the map product for printing and plotting. For this task, you will stay with Data View.
7. This step is to change the symbol for *emidastrm*. Click the symbol for *emidastrm* in the table of contents to open the Symbol Selector dialog. You can either select a preset symbol (e.g. river) or make up your own symbol for *emidastrm* by specifying the color, width, and properties of the symbol. Choose the preset symbol for river.
8. Next classify *emidalat* into the elevation zones of <900, 900-1000, 1000-1100, 1100-1200, 1200-1300, and >1300 meters. Right-click *emidalat*, and select Properties. Click the Symbology tab. Click Classified in the Show frame. Change the number of classes to 6, and click the Classify button. The Method dropdown list shows seven methods. Select Manual. There are two ways to set the break values for the elevation zones manually. To use the first method, you will check the box to snap breaks to data values and then click the first break line and drag it to the intended value of around 900. Then set the other break lines at

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<sup>3</sup> The UTM (Universal Transverse Mercator) geographic coordinate system is a grid-based method of specifying locations on the surface of the Earth that is a practical application of a 2-dimensional Cartesian coordinate system. It is a horizontal position representation, i.e. it is used to identify locations on the earth independently of vertical position, but differs from the traditional method of latitude and longitude in several respects [Wikipedia].

approximately 1000, 1100, 1200, 1300, and 1337. To use the second method, you will click the first cell in the Break Values frame and enter 900. Then enter 1000, 1100, 1200 and 1300 for the next four cells. Click OK to dismiss the Classification dialog.

9. You can change the color scheme for *emidalat* by using the Color Ramp dropdown list in the Layer Properties dialog. Sometimes it is easier to select a color scheme using words instead of graphic views. In that case, you can right-click inside the Color Ramp box and uncheck Graphic View. The Color Ramp dropdown list now shows White to Black, Yellow to Red, etc. Select Elevation #1. Click OK to dismiss the dialog. **Take a screenshot** showing the classified *emidalat*.
10. ArcMap has access to several extensions including Spatial Analyst. Select Extension from the Customize menu and check Spatial Analyst. Then click the ArcToolbox Window button to open ArcToolbox or select ArcToolbox from the Geoprocessing menu. Click the Spatial Analyst dropdown arrow, point to Surface, and double-click Slope. In the Slope dialog, select *emidalat* for the input raster and click OK to run the command. A new slope layer of *emidalat* is created. **Take a screenshot** showing the slope layer.
11. You can save Task 2 as a map document before exiting ArcMap. Select Save As from the File menu in ArcMap. Navigate to the ArcGISIntroduction database, enter ArcGISIntroduction for the file name, and click Save. ArcMap automatically adds the extension .mxd to ArcGISIntroduction. Data sets displayed in Task 2 are now saved with ArcGISIntroduction.mxd. To re-open ArcGISIntroduction.mxd, ArcGISIntroduction.mxd must reside in the same folder as the data sets it references.
12. To make sure that ArcGISIntroduction.mxd is saved correctly, first select Exit from ArcMap's File menu. Then launch ArcMap again. ArcGISIntroduction.mxd should appear in the ArcMap dialog. If not, select an existing map, navigate to the ArcGISIntroduction database, double-click on ArcGISIntroduction.mxd.