

GY461 GIS 1: Environmental Campus Topography Project with ArcGIS 9.x

I. Introduction

In this project you will use data from a topographic survey of the USA campus to generate 2 separate maps:

1. A color-coded 2-dimensional topographic contour maps that displays buildings and roads on the campus property
2. A 3-dimensional topographic model that can be displayed in ArcScene via the “fly-by” tool.

The starting files can be located on the web site:

http://www.usouthal.edu/geography/allison/gy461/gy461_project_resources.htm

Look for the download link to “Campus.exe” self-extracting ZIP file under the Campus topographic project documentation

II. Step 1: Create a Folder for the Project and a New ArcMap Project

In this step you will create a new folder for the project and start a new ArcMap project file, and set the coordinate system for the project.

Create a New Folder

1. Start Windows File Explorer from the desktop or start menu.
2. In the left window pane navigate to the “C:\ArcGIS_Data\{your initials}” folder and highlight your initials with a left click. Your initials should already be here from prior projects- create it if you haven’t done so yet.
3. Select “File” > “New” > “Folder” from the menu to create the new “Campus” folder under “\ArcGIS_Data\{your initials}”. Your folder structure should look similar to **Figure 1**.
4. Open a web browser and navigate to:

http://www.usouthal.edu/geography/allison/gy461/gy461_project_resources.htm

Click on the “Project 5 starting file (Self-extracting ZIP): Campus.exe” link to download the file. Use the above new folder “\ArcGIS\{your initials}\Campus” for the download location.

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5. Using Windows File Explorer double-click on the downloaded “Campus.exe” to extract the files for the project. The extract dialog window should appear similar to **Figure 2**. Left-click on the “Unzip” button to unzip the files. You should now see a variety of files appear in the new folder.

Create a New ArcMap Project

1. Start “ArcMap” from the desktop or start menu.
2. In the opening dialog window indicate that you wish to create a new blank project.
3. Right-click on the word “Layers” in the left window pane of ArcMap and select “Properties”. Under the “Coordinate System” tab select UTM NAD 1927 zone 16 and indicated in **Figure 3**.
4. Under the “General” tab set the title to “Campus Topography Project” and set a reference scale of 1:5000.
5. Save the project file (“File” > “Save As”) as “CampusTopography.mxd” in the “Campus” folder.

Add Survey Data to Project

The “XYZ.xls” file contains survey data that are in Alabama SPCS NAD27 west zone. Elevations (Z) are in feet.

1. Use the “Tools > Add XY data” menu option to add the “XYZ.xls” file to the ArcGIS project as point features. Remember that the coordinate system for this file is NAD27 Alabama SPCS West zone.
2. Turn on elevation labels with “Properties > Labels” after right-clicking on the “XYZ\$ Events” layer (**Figure 4**). Rename the layer with the “General” tab to “Topographic Data”.

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Add Buildings and Roads for Reference

1. Add the “Buildings” and “Roads” layers for reference. Note that these are shape files with a predefined projection file so you do not need to indicate a coordinate system.
2. Make roads a black color 1 unit wide. Make buildings a red line color 1 unit wide.

Create an Elevation Grid and Contours with Spatial Analyst

1. If the Spatial Analyst toolbar is off turn it on by right-clicking on the gray region containing other active toolbars.
2. From the Spatial Analyst toolbar drop-down list select “Interpolate to Raster > Kriging”. Fill the dialog window as indicated in **Figure 5**. Use the folder name “KrigGrid” for output. With ArcGIS version 9.3 if you get an error message stating that there are “too many discrete values” or something similar increase the size of the cell spacing to a larger value.
3. Color-code the elevation grid so that even 10 foot intervals are apparent on the map. Do this by right-clicking on the “KrigGrid” layer, then select “Properties > Symbology”. Select the “Classify” button, and then set 13 equal intervals. Then change the method to manual and set the cutoff values to even 10-foot intervals to match the dialog window in **Figure 6**.
4. Generate from the Spatial Analyst toolbar drop-down list with “Surface Analysis > Contour” menu selection. Setup the dialog window to match **Figure 7**.
5. See **Figure 8** for a check on the project so far- your project should appear very similar to this figure.

Create a TIN and Animation for ArcScene

1. Activate the 3D Analyst toolbar. Select the “Create/Modify TIN > Create from features” option on the drop-down list options. Set the dialog settings as in **Figure 9**. Use the following table as a guide:

Feature	Height Source	Triangulate As	Tag Value Field
Topographic Data	Z	Mass points	<none>
TopoContours	CONTOURS	Hard line	N/A
Buildings	<None>	Hard line	N/A
Roads	<None>	Hard line	N/A

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Create the tin in a folder named “tin” as indicated in **Figure 9**.

2. Your project should appear similar to **Figure 10** when the TIN is added to the project file.

Create Animation of Fly-Through in ArcScene

1. Start the ArcScene application from the Desktop or from ArcMap. Load the TIN from your folder. Use the “Navigate” tool on the toolbar to position the viewpoint over the southwest corner of the campus (**Figure 11**).

2. Right-click on the gray area right of the toolbars and activate the “Animation” toolbar. On the animation toolbar select the “open animation controls” button.

3. Select and use the “fly” through tool. Remember that left clicks speed up the animation forward, whereas the right mouse button reverses the effect. Moving the mouse left or right makes the fly through bank left or right. Practice using this tool until you can control a fly through 3 Mile Creek on campus.

4. When you are proficient at the fly-through select the “Fly” tool, and then hit the “Record” button on the animation controls toolbar. Proceed with the fly-through, and then hit the “Stop” button on the animation control toolbar. With the “Animation” toolbar save the animation to “Fly3MileCreek.asa”. Save the entire ArcScene project as “CampusTopography3D.sxd”.

5. Practice replaying the animation with the “Play” button in “Animation Controls” toolbar.

Print a Hard Copy of the Elevation Grid and Contours

1. In ArcMap turn off the TIN. Use the “File > Print and Page Setup” option to select the color laser printer (HP2600n) in landscape mode (**Figure 12**).

2. Select “Layout” from the “View” menu and proceed to add the following to the layout:

- a. North Arrow
- b. Scale Bar (Meters)
- c. Scale Text (RF)
- d. Title (“Campus Topographic Project”)
- e. Legend

Use a scale of 1:10,000 for the hard copy.

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See **Figure 13** as an example of the layout. Print a hard copy on 8.5 x 11 inch paper to turn in for the project.