

ES341 Fundamentals of GIS - Final Study Guide

Study Tips

- Read all chapters in book, study figures and tables, compare chapters to notes
- Use study guide as a check list for knowing key terms, key concepts, key skills
- Go back through the class / lab exercises, make sure you can do the math work
- Go back through the key skills emphasized in the tutorials, make sure you know the software skills
- I would study for a minimum of 10-12 hours if I wanted to do well on this exam.
- create a sheet of key ArcMap commands - bring to exam; it will make your job easier.
- bring a calculator to the exam.

Key Words and Skills Since Midterm

Map Projections – Part 2

x,y coordinates
map projection
georeference system
map registration
map resolution
metadata
datum
North American Datum
NAD1927
NAD1983
Geographic Coordinate System
(GCS – WGS1984 lat. long.)
UTM Zone 10N NAD1927
UTM Zone 11N NAD1927
Oregon State Plane North
Oregon State Plane South
Oregon Statewide Lambert
Arc Toolbox

- Define projections tool
- Project tool

*.prj projection file

Geoprocessing (Price Ch. 7)

Geoprocessing defined
geoprocessing tools
geoprocessing of shape files
merge
clip
dissolve
erase
intersect
union
append

buffer	adding lines to shapes
clipping functions	saving edits to shapes
merging shape files	rotating features
polygon editing	deleting features
splitting polygons	create features
merging polygons	
polygon islands	
Arc Toolbox	
Feature extraction	
Data export	
<i>Data Editing (Price Ch. 12-13)</i>	
Editor Toolbar	Numerical data
Point-snapping	attribute database
Data editing	fields
Remove dangle nodes	records
Edge matching	geodatabase
creating shape files	*.dbf file
heads-up digitizing	table editing
convert to shape file	add field
polygon tool	table link
split polygon tool	table join
complete polygon tool	spatial join
shape editing	attribute data calculation
editing shapes	field calculator
vertex	field types
vertex tolerance	floating point
snap tolerance	single precision
node	double precision
shape split	string (text)
shape merge	integer
split tool	precision
digitizing polygons	scale
digitizing polylines	query tools
vertex editing	query building
adding points to shapes	logical expressions
adding polygons to shapes	key fields
	one-to-many relations

SQL	surface - create contours file-manage data sources theme-convert to shape file query builder for grids classify legend Analysis- Calculate density from point file grid interpolation creat contours from grid theme	last returns bare-earth model digital elevation model DEM 1-m resolution Point density Pulse intensity Post-processing algorithm Aerial surveys Laser swath mapping Land classification Vegetative structure Ground cover Flight lines Overlap Sidelap Flight plan TIN GRID DEM Data correction Roll-yaw-pitch GPS – positioning systems Errot correction Urban modeling Watershed modeling Topographic analysis Resolution Positional accuracy Pulse rate Point density Altitude Field of view Multiple-return lidar Near-infrared Water absorption Fog-rain-absorption Point cloud Laser altimetry First-return model
<i>Special File Types</i>		
DEM Data *.dem		
DRG Data *.tif *.tfw		
Shapefile (*.shp, *.dbf, *.shx)		
ARC/INFO export file (*.e00)		
Arc/Info GRID (raster)		
ArcGIS geodatabase (*.mdb)		
OrthophotoQuads (*.sid *.sdw)		
DOQ		
*.zip – zip file		
Tar.gz - unix tar file		
*.xml metadata file formats		
<i>Spatial Analyst / Raster Analysis</i>		
Spatial analyst extension		
Discrete point data		
Grid format		
DEM		
ASCII format		
Binary format		
Grid attributes		
raster data		
grid themes		
georeferencing rasters		
world file		
rectification		
Control Points		
legend editor		
spatial analyst extension		
symbolization – stretch		
symbolization – classify		
symbolization – unique values		
DEM		
elevation grid		
inquire tool		
cell value		
Grid Data Source		
color ramp		
hillshade		
theme - convert to grid		
surface-derive slope		
surface - compute hillshade		
	<i>Terrain Mapping</i>	
	DEM / DTM	
	surface - create contour map	
	surface - create hillshade map	
	surface - create slope map	
	surface-create aspect map	
	<i>Map Algebra</i>	
	Raster calculator	
	grid map algebra	
	matrix algebra	
	map calculator - evaluate	
	algebraic transformation of grid	
	<i>Data Display</i>	
	legend editor	
	annotation	
	map classification	
	polygon labels	
	text labels	
	label tools	
	labeling map feature from dbase	
	Lidar Concepts	
	LIDAR	
	Laser	
	Laser pulse	
	EM spectra	
	Speed of light	
	Wavelength	
	Frequency	
	Reflection	
	Absorption	
	Two-wave travel time	
	Laser source	
	Pulse detector	
	kHz – kilohertz	
	first-returns	
	second-returns	
	<i>Metadata (Price Ch. 15)</i>	
	FGDC standards	
	*.xml file format	
	Lineage	
	Positional accuracy	
	Attribute codes	
	Spatial reference	

Price Text Key Word Search Terms

Spatial join
Distance join
Inside join
One to one join
Many to one join
One to many join
Simple vs. summarized joins
Geoprocessing
Map overlay
Clip tool
Erase tool
Intersect tool
Union tool
Polygon sliver
Dissolve tool
Buffer tool
Append / merge tool
Python scrip
ArcGIS Model Builder
ArcGIS Environment Settings
Calculate Geometry Tool
Dangle node
Snapping
Snap tolerance
Node snapping
Edge snapping
Edge matching
Map algebra
Reclassify
Integer raster
Floating point raster
Spatial analyst
Raster masking
Personal geodatabase
Feature dataset
Geodatabase annotation
FGDC
Metadata standard
XML

Key Software / Analytical Skills

Can you work with the following tools?

spatial analyst, projection utilities, geoprocessing tools, editor toolbar?

do you know the basic functions of these tools, the types of data they are used with, the types of analytical procedures that can be performed with them?

Can you create a nice looking map in layout and print it out?

Can you define, project and reproject data?

Can you incorporate raster and vector data in a GIS exercise?

Can you perform a slope analysis using spatial analyst?

Can you create a hill-shading model using spatial analyst?

Can you create vector and raster-based queries to identify select areas on a map?

Can you add data to a table using the table editor?

Can you use the geoprocessing to clip, dissolve, merge data?

Can you find and download gis data from web sites, convert and decompress the data?

Can you use the editing tools to create and edit polygons?

Can you employ heads-up digitizing to create your own shape files? Can you use image analyst to mosaic air photos?

Can you use a photo / image base and create a shape file via digitizing?

Do you know what the following files / data types are: *.e00, *.shp, *.grd, Mr. Sid, *.tif, *.jpg, *.tfw, *.sdw, *.zip, *.tar.z, DOQ, DRG, DEM

Can you download and import a USGS DEM into an arcview / spatial analyst grid format?

What's the difference between an *.dem and *.grd file format?

Can you manage *.zip and *.tar.gz files?

Do you understand basic concepts of map algebra and what types of data it's used on?

Anticipate: 2-3 essay questions focusing on broad summaries of GIS, the types of applications it may be used for, the components of ArcMap specifically.

GOAL OF FINAL EXAM: To test your ability to use ArcMap and ArcToolbox as a tool to ask questions of spatial data.