

GEOGRAPHIC INFORMATION SYSTEMS

LAB MANUAL

L. S. Barbato

GISPress

Contents

Introduction	i
Canvas Submission Instructions.....	i
Course GIS Software	ii
Other Course Software Requirements	ii
Immediately Report Technical Issues.....	iii
Computer Requirements.....	iii
Download Lab Data the First Week of Class.....	iv
Back up your Work.....	iv
Handout 01 - Lab Policies	v
Understanding Lab Manual Formatting.....	vi
Lab 01 – Getting Started	1
Assignment 01-A: Windows File Management.....	2
Assignment 01-B: Create a TTU ArcGIS Account.....	11
Handout 02 – Install ArcGIS Pro on a PC	15
Handout 03 - Windows Snip & Sketch Tool Instructions	16
Assignment 01-C: Unzipping Files.....	18
Assignment 01-D: Introducing ArcGIS Pro – Online assignment	21
Web Links.....	29
Lab 02 – Make Your First Map and Layout.....	31
Assignment 02: Make Your First Map.....	32
Part 1: Getting Started.....	33
Part 2: Texas Total Hispanic Population Map.....	45
Part 3: Percent Hispanic Population Layout (Normalization)	57
Web Links – Esri GIS.....	77
Interactive Reading: ArcGIS Pro Terminology.....	78

Lab 02 Bonus: Create a US Black Population Map	99
Lab 03 - Make an Inset Map & GIS Data Formats	119
Assignment 03-A: Make an Inset Map	120
Assignment 03-B: GIS Data Formats	145
Lab 04 – Qualitative and Quantitative Data Classification	167
Assignment 04-A: Qualitative Classification of the United States (Individual States)....	169
Assignment 04-B: Qualitative Classification of United States Regions	182
Assignment 04-C: Quantitative Classification of Florida Population	197
Lab 04 Bonus: Qualitative Classification using Tornado Damage Ranks.....	216
Web Links – Color Brewer <i>and</i> Meridian Conference	230
Lab 05 – Geographic Coordinate Systems.....	232
Assignment 05: Working with Geographic Coordinate Systems	233
Exercise 05: Scale Bars and Scale Text	252
Lab 06 - Map Projections	269
Lab Data Set Up	270
Exercise 06: Explore Map Projections.....	272
Map Assignments 06-A to 06-I: Map Projection Portfolio	282
Map Assignment 06-A: Mercator Projection.....	293
Map Assignment 06-B: Miller Cylindrical Projection	299
Map Assignments 06-C, 06-D, 06-E, 06-F: Mollweide, Robinson, Fuller, and Goode’s Homolosine (Land)	301
Map Assignment 06-G: Polar Stereographic Projection	306
Map Assignment 06-H: USA Contiguous Albers Equal Area Conic.....	308
Map Assignment 06-I: North America Continental Map Projection	310
Web Links – USGS Map Projections	318
Bonus Lab 07 - Geoprocessing & Displaying Raster Data – Week 1.....	320
Part 1: Data Preparation.....	322

Part 2: Start a Project and Examine Data	331
Part 3: Perform Geoprocessing	337
Bonus Lab 07 – Geoprocessing & Displaying Raster Data – Week 2	348
Part 4: Create Junction, Texas Map.....	348
Part 5: Create Inset Map and Layout	360
Lab 08 – Raster Processing and Analysis.....	374
Lab Set Up	374
Raster Data Processing	376
Assignment 08-A: Hurricane Storm Surge.....	388
Assignment 08-B: Potentially Affected People.....	391
Bonus Lab 09 – GIS on the Internet.....	406
Assignment 09-A: ArcGIS Online – GIS on the Internet	407
Assignment 09-B: TTU ArcGIS Online Account and Website	413
Assignment 09-C: Explore Basemaps in ArcGIS Pro	418
Assignment 09-D: Access ArcGIS Online in ArcGIS Pro	423
Assignment 09-E: Access the Living Atlas in ArcGIS Pro	426
Web Links – Cartouches and Embellishments.....	430
Lab 10 - Caprock Canyons Map Project Week 1	432
Part 1: Prepare Lab Data	433
Part 2: Download Data from Internet.....	435
Part 3: Geoprocess Data.....	448
Handout 04 – GIS Data Sources Reference.....	466
Handout 05 – USGS Topographic Map Symbols	471
Lab 10 - Caprock Canyons Map Project Week 2	473
Part 4: Develop Map.....	473
Buffalo Commons Final Project Assignment.....	508
Lab 11 - Buffalo Commons Final Project Week 1	510

Part 1: Set Up.....	511
Part 2: Create Feature Classes	514
Lab 11 - Buffalo Commons Final Project Week 2.....	546
Part 1: Create Feature Classes	546
Part 2: Join Tables.....	561
Lab 11 - Buffalo Commons Final Project Week 3.....	581
Part 1: Create Proposed Buffalo Commons area(s) from Suitable Counties	582
Part 2: Make a Study Area Map	591
Part 3: Make a Population Density Map	594
Part 4: Create a Template for Subsequent Maps	601
Part 5: Create a Population Change Map.....	603
Part 6: Create a Farmland Value Map	607
Part 7: Create a Percent Federal Lands Map	610
Part 8: Create a Counties Adjacent to Indian Lands Map	613
Part 9: Create a Final Suitability Map.....	618
Part 10: Create a Buffalo Commons Final Map	621
Part 11: Evaluate Your Maps	624
Part 12: General Instructions for Map Portfolio or Report	625
Upload Report to Canvas	629
Report Template.....	630
Abbreviated Rubric for Buffalo Commons Map Portfolio / Report	643
Bonus Lab 12 – Create Data	647
Assignment 12-A: Adding Different Data Formats.....	649
Assignment 12-B: Joining Tables.....	663
Assignment 12-C: Creating New Data.....	671
Acknowledgements	689