Geology 5402 - Interdisciplinary Geographical Information Systems



Fall, 2016 Class: MWF 9-9:50, WSB 301 Lab T 6-9, WSB 310

Dr. Kevin Urbanczyk – WSB-320, 837-8110, <u>kevinu@sulross.edu</u> Office Hours: MW 10-11; TR 8:30-9:30

Course description: A geographic information system (GIS) is a computerized information system that is designed to integrate various types of spatial and nonspatial data for a particular area and application. It is a "thematic" map database in that it allows for various "themes", or layers of data types, to be superimposed upon each other. The resultant thematic map can then be printed, published to the internet, and/or analyzed for specific, generally spatial related, queries.

This class is designed to introduce the fundamental concepts of maps and GIS, and to provide the student with experience in utilizing one of the standard desktop GIS packages; ESRI's ArcGIS. The class is "interdisciplinary" – the application of a GIS is only limited by the imagination of the individual. The only prerequisite is a knowledge of basic computer skills. Typical applications of a GIS include: earth science, range management, ecology, hydrology, geography/urban planning, business management/trend and market analysis, sociology, archeology, and law enforcement.

Texts:

Price, Maribeth, Mastering ArcGIS 7th edition, McGraw-Hill ISBN 978-0-07-809514-6 Optional Texts:

Jensen and Jensen, 2013, Introductory Geographic Information Systems, Pearson, ISBN 978-0-13-614776-3

Bernhardsen, T, 2002, Geographic Information Systems, An Introduction, 3rd edition, John Wiley and Sons, Inc., ISBN #0-471-41968-0

Chang, K, 2006, Introduction to Geographic Information Systems, 4th Edition, McGraw Hill, ISBN 0-07-282682-7

Clark, K.C., 2011, Getting Started with Geographic Information Systems, 5th edition, Prentice Hall, ISBN 978-0-13-149498-5

Grading: Grading will be based upon: Attendance/quizzes; weekly labs, homework assignments/field trip, two midterms; one final exam, and a term project (s). There will be 12 quizzes, and 12 labs. The final point breakdown will be:

	points each	#	Total	%
Quizzes	5	12	60	12.8%
Labs	10	12	120	25.5%
Homework/Field trips			50	10.6%
Exam 1	50	1	50	10.6%
Exam 2	50	1.	50	10.6%
Final Exam	70	j	70	14.9%
Term Project	"		70	14.9%

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The final grade scheme is based upon the standard 90-100 = A, 80-90 = B, 70-80 = C, 60-70 = D, and <60 = F.

Conduct. Students are expected to observe the University's Code of Student Conduct (see Student Handbook, http://www.suiross.edu/pages/3633.asp). Please turn OFF all cellular phones; IPODs, MP3s, etc. No tobacco products allowed in class

Expected Learning Outcomes/Objectives: Upon completion of this course, students will apply critical reasoning and problem solving skills to: 1. Understand the basic concepts of the GIS system; 2. Create ArcMap projects using readily available data types; 3. Create vector GIS data from GPS and from onscreen editing; 4. Manipulate raster based GIS data, 5. Perform spatial analysis using geoprocessing skills; and 6. Prepare output of these data and analyses; 7. Perform any other GIS related functions needed to complete the term project discussed above.

Methods of Assessment/Evaluation: Learning outcome assessment will be made on the basis of weekly quizzes, periodic homework assignments, weekly lab exercises, two Midterm Exams, one Final Exam, and a term project (or projects for graduate students). The exams will assess the application of critical reasoning and problem solving skills through short answer questions, multiple choice questions, and essay type questions. The graded exams will be reviewed, by discussing the logic of the answers to and content of the questions missed by a majority of the class. The quizzes are designed to encourage students to read the assigned material in advance of the lectures, homework assignments will assess student problem solving skills in applying, describing, and explaining principles of GIS. Completion of the term project will require a thorough knowledge of GIS principles.

<u>Disability</u>: It is Sul Ross State University policy to provide reasonable accommodation to students with disabilities. If you would like to request such accommodations because of a physical, mental, or learning disability, please contact the Disabilities Services Coordinator in the University Center, Room 211, or call (432) 837-8178.

week	date	Topic	Lecture /	Extra material for discussion _
				SRGIS library, NAS, shares, drive mapping, data
. 1	8/22	Introduction, examples	Intro/1	redundancy issues,
	8/24	GIS DATA: Details of our software: ESRI ArcGIS	nnaorn	reduitdaricy (ssues,
	8/26	GIS data		
-	CIEC	DO CARA		AUTORO TOO
2	8/29	84		Add DAGs, group in TOC,
4	8/31	Managing GIS data	. 2	create boundary py
		lans (a C L L L L L L L L L L L L L L L L L L		
-	9/2	GPS/Coordinate Systems	BB	GPS
3	9/5	Labor day Holiday		
	9/7			
	9/9			20 ₄ 89
4	9/12	Coordinate Systems	. 34.	Add DOQQ's group in TOC
	9/14			
	9/16			
				Add LANDSAT subset, set
				symbology, enable datatrame
5	9/19	Mapping GIS data	4	clip from boundary py
	9/21		-	T. A. S.
-8	9(2)			
	E	† · · · · · · · · · · · · · · · · · · ·		Add TXDDT trans, borrow
6	9/26	Presenting GIS data	5	symbology from layer file, save
	9/28	Exam 1	, rej	aynabology normayer tile, save
	9/30	LAGIN A		
	3/130	-5m-a-		Address acres because
7 10/3 10/5	1032	Attribute Data	6	Add contours, borrow
		Autibate para	-8	symbology from layer file
-	10/7			
25		The state of the s		
8	10/10	Basic Editing	7	Add stream lines, set
	10/12	·		
	10/14			1
<u>.</u>	E-1.00			Add geology / soils, set
3	10/17	Queries	8	symbology
-	10/19			
	10/21	Enam2		
				Add NED/DEM, calc hillshade,
10	10/24	Spatial Joins	9	slope, aspect
	10/26			1
	10/28			
			**	Calculate gonal statistics
	10/31	Map Overlay and Geoprocessing	10	combing a py layer with
	11/2		_	
	17/4			# =
12		Raster Analysis	11 (1	Project work
	11/9			
	1771			
13	11/14	Editing and Topology	12	TBD
a Pode"	11/16			
	11/18		î	
14		Geodatabases / Metadata	13/14	TBD
17		Hankspying break	HIGH	TO THE POPULATION OF THE PARTY
white warmer to				
15		Project Presentation		——————————————————————————————————————
		Project Presentation; Last Class Final Exam 8 AM		