DEL MAR COLLEGE **CS/IT DEPARMENT-VB 113**
101 Baldwin, CC TX. 78404 **(361) 698-1299**

I: GISC 2301. DATA ACQUISITION AND ANALYSIS IN GEOGRAPHIC INFORMATION SYSTEMS (GIS) (2-4-3) 45.0702

Course Description: Study of management of geographic information, system life cycles, and costs and benefits. Topics include demographic management and institutional issues such as data providers, data management, combination of attribute and graphical data, information and storage and access, Texas and national standards for spatial data; and applications of GIS for demographic modeling and analysis. Prerequisite: GISC- 1421.

Course IDEA Objectives

Essential: Gaining factual knowledge of GIS (terminology, classifications, methods, trends)
Essential: Learning fundamental principles, generalizations, or theories.
Essential: Learning to apply course material (to improve thinking, problem solving, and decisions).
Important: Learning how to find and use resources for answering questions or solving problems

II: SCANS (Secretary's Commission on Achieving Necessary Skills) competencies are integrated into these course competency-based outcomes to improve your education by helping you better define and use work place skills needed for employment. Each competency will integrate several scans competency to assist you in developing and reinforcing employable skills. Competencies are criterion reference (i.e. they are measured against predetermined levels of proficient in skill for effective job performance).

The know-how identified by SCANS is made up of five workplace competencies and three foundation skills that are needed for solid job performance. These are:

- **Workplace Competencies** – Effective workers can productively use:
  Resources – They know how to allocate (C1) time, (C2) money, (C3), materials, and (C4) staff
  Information – They can (C5) acquire and evaluate data, (C6) organize and maintain files, (C7) interprets and communicate, and (C8) use computers to process information.
  Interpersonal skills – They can (C9) work on teams, (C10) teach others, (C11) serve customers, (C12) lead, (C13) negotiate, and (C14) work well with people from culturally diverse backgrounds,
  Systems – They (C15) understand social, organizational, and technological systems, (C16) they can monitor and correct performance; and (C17) they can design or improve systems.
  Technology – They can (C18) select equipment and tools, (C19) apply technology to specific tasks and (C20) maintain and troubleshoot equipment.

- **Foundation skills** – Competent workers in the high-performance workplace need:
  Basic Skills – (F1) reading, (F2) writing, (F3) arithmetic and (f4) mathematics, (f5) listening and (F6) speaking.
  Thinking skills – (F7) to think creatively, (F8) to make decisions, (F9) to solve problems, (F10) to visualize, (F11) the ability to learn, and (F12) to reason.
  Personal Qualities – (F13) individual responsibility, (F14) self-esteem, (F15) sociability, (F16) self-management, and (F17) integrity.

III: Learning Outcomes / Job Skills
The student will be able to analyze problems, visualize solutions to problems, design and modify programs logic to create workable computer programs.

Course competencies – Through class interaction reading materials and individual and group study, and laboratory assignments the student will be able to:

A. Understand the use of spatial data in GIS systems
B. Understand types of spatial data
C. Explain coordinate systems and their implementation
D. Demonstrate understanding of data management
E. Understand data sources and availability
F. Develop systematic approach to geo-referenced database creation
G. Develop the use of GPS unit
H. Explain the integration of GPS data into a GIS geo-referenced database
I. Develop proper reporting and presentation of interpreted data
J. Explain the uses of demographic information
K. Understand Federal or State standards as regarding spatial data
L. Understand the basis of numerical modeling of data
M. Understand and explain constraints and limitations of modeled data

Instructional Strategy – To facilitate mastery of above listed competency. The instructor will be responsible for:
1 Gaining the students attention
2 Informing student of objectives
3 Stimulate recall of prior knowledge
4 Presenting new material
5 Providing guided practice
6 Eliciting performance
7 Providing feedback
8 Assessing performance
9 Enhancing retention and transfer of knowledge

Student assignments – To demonstrate mastery of the competency listed above, the student will be responsible for:
1 Completing and achieving a passing grade on unit tests and examinations.

2 Attending class, attention to lectures, and completing required reading and on-line materials.
3 Completing and submitting assigned projects and homework by due dates.
4 Class and group laboratory participation to demonstrate mastery of GIS database use, working with spatial data, use of GPS unit, and integration of GPS data to GIS geo-reference database.
5 Completing and achieving a passing grade in a comprehensive final examination.

- **Additions to Course Goals (Learning Outcomes (LOs) based on Key Activities (KAs) under Critical Work Functions (CWF) in the Geographic Information System (GIS) Technician Skill Standards identified by the GIS Advisory Board with cooperation from Del Mar College. The skill standards (AEKS Matrix) were recognized May 22, 2007, by the Texas Skill Standards Board (TSSB).**

1. Define the data requirements, research sources of available data, and purchase data from reputable source. KA1.1
2. Develop (and document with metadata) database(s) including: defining geometry, attributes, relationships, topology rules, feature behaviors such as types and domains, incorporating data schema models. KA1.2
3. Determine data compatibility (projection), perform data conversion, populate feature attributes. KA1.3
4. Perform both tablet, COGO, and on-screen digitization with attribution. KA1.4
5. Collect field attribute and location data via GPS (Tablet PC/PDA). KA1.5
6. Geocode data. KA1.6
7. Perform quality control (QC) and quality assurance (QA) of GIS databases. KA1.7
8. Rectify images to meet data standards. KA2.3
9. Develop procedures and schedules for data maintenance. KA3.1
10. Maintain data QA/QC through update operations: (add/delete/change) KA3.2
11. Perform data layer updates and update metadata (imagery/themes). KA3.3
12. Convert data between formats. KA3.4
13. Perform database performance tuning through compression, indexing, etc. KA3.5
14. Conduct Spatial/Non-Spatial Analysis KA4.1
15. Create scripts KA4.2
16. Preprocess geographic data (generalize, subset). KA4.3
17. Perform geo-processing through clipping, buffering, overlay, etc. KA4.4
18. Generate descriptive and spatial statistics. KA4.5
19. Perform quality control and assurance. KA4.6
20. Interpret data results. KA4.7
21. Create maps. KA5.1
22. Create analysis report. KA5.2
23. Create tables KA5.3
24. Create charts. KA5.4
25. Perform quality control and assurance for applications, such as beta testing. KA6.4
26. Create help files and support documentation. KA6.5
27. Establish data custodianship and distribute and assign database permissions according to organizational policies. KA7.1

28. Organize file structure (e.g. create directories, perform data and directory housekeeping) KA7.2
29. Perform data maintenance through archival functions. KA7.3
30. Participate in GIS awareness events such as presentations, conferences and user groups. KA9.5
31. Continue professional education through credit and/or noncredit courses, technical training and informal education, such as online courses. KA10.2

IV: Relations of Learning Objectives to SCANS Competencies

□ Competency-based Outcomes with Workplace Proficiency Levels

	Resources				Information					Interpersonal Skills					Systems			Technology		
	C 1	C 2	C 3	C 4	C 5	C 6	C 7	C 8	C 9	C 10	C 11	C 12	C 13	C 14	C 15	C 16	C 17	C 18	C 19	C 20
A					3	3		3							2		2			
B					4	4		3							3		3			
C					3	3		3							3		3			
D	2		2	2	4	4		4		2					4				2	
E	2		2	2	4	4	2	4	3	3										
F	2	2	2	2	2	2	2	2	2	2					3	3	2	3	3	2
G	3	3	3	3	4	4	2	3	3	3					3	3	2	3	3	2
H	2		2		2	2	2	2							2	2		2	2	
I	3	3	3	3	3	3	3	3	3	3										
J					2	3	2	2												
K					2	3	2	2												
L	2		2		2	2	2	2							2	2		2	2	
M	2		2		2	2	2	2							2	2		2	2	

Competency-based Outcomes with Foundation Skill Level

	Basic Skills								Thinking Skills				Personal Qualities				
	F 1	F 2	F 3	F 4	F 5	F 6	F 7	F 8	F 9	F 10	F 11	F 12	F 13	F 14	F 15	F 16	F 17
A	4	4	3	3	4	4			3	4	4	3	3			3	2
B	4	4	3	3	4	4			3	4	4	3	3			3	2
C	4	4	3	3	4	4			3	4	4	3	3			3	2
D	4	4	3	3	4	4	2	2	3	3	3	3	4			4	2
E	4	4	3	3	4	4	2	2	3	3	3	3	3			3	2
F	4	4	3	3	4	4			3	3	3	3	3			3	2
G	4	4	3	3	4	4			3	3	3	3	3	3	3	3	2
H	4	4	3	3	4	4	2	2	3	3	3	3	3			3	2
I	4	4	3	3	4	4	3	2	3	3	3	3	4	3	3	3	2
J	4	4	3	3	4	4			3	4	3	3	3			3	2
K	4	4	3	3	4	4	2	2	3	3	3	3	3			3	2
L	4	4	3	3	4	4	2	2	3	3	3	3	3			3	2
M	4	4	3	3	4	4	2	2	3	3	3	3	3			3	2

Proficiency Level for the SCAN Competency Relations Tables
1 – rarely performs task
2 – routinely performs task w/ moderate supervision
3 – routinely performs task w/minimum supervise
4 – routinely performs tasks
5 – routinely performs task over/beyond designation task