



**DEL MAR COLLEGE**  
101 Baldwin, CC TX. 78404

**CS/IT DEPARTMENT-VB 113**  
(361) 698-1299

**I: GISC 1421 Introduction to Raster Based Geographic Information Systems (GIS)**  
**(3-3-4) 45.0702**

**Course Description:** Introduction to raster-based GIS sets including raster-based information such as images of photographs, acquisition of such data, and processing and merging with vector data.

Students create projects from GPSS data and raster images. Students create and manage geodatabases and create maps of the data. Students create maps and perform analysis using raster image data. **Suggested prerequisites: ITSC 1405, GISC 1311 or GISC 2420 or instructors' approval.**

**Course IDEA Objectives**

Essential: Gaining factual knowledge of GIS (terminology, classifications, methods, trends)

Essential: Learning fundamental principles, generalizations, or theories.

Essential: Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course.

**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 geodatabase data in GIS systems
- B. Explain georeferencing of photos or images to maps
- C. Create and edit feature in a Geodatabase
- D. Understand raster data sources and availability
- E. Analyze geographic information collected in raster format
- F. Develop the use of Hill shade and other raster formats into maps
- G. Use the spatial analysis functions to solve GIS problems
- H. Develop proper reporting and presentation of interpreted data
- I. Explain the uses of symbolizing and analysis of 3D data
- J. Understand how to create and covert raster surfaces
- K. Calculate raster surfaces
- L. Understand the basis of modeling with 3-D data
- M. Understand and explain constraints and limitations of raster 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



**•Evaluation: 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 raster data, and integration of raster 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. Perform quality control (QC) and quality assurance (QA) of GIS databases. KA1.7
6. Scan hard copy images into digital format. KA2.1
7. Geo-reference digital imagery. KA2.2
8. Rectify images to meet data standards. KA2.3
9. Perform image analysis (classification) KA2.4
10. Convert data between formats. KA3.4
11. Perform database performance tuning through compression, indexing, etc. KA3.5
12. Conduct Spatial/Non-Spatial Analysis KA4.1
13. Perform geo-processing through clipping, buffering, overlay, etc. KA4.4
14. Generate descriptive and spatial statistics. KA4.5
15. Interpret data results. KA4.7
16. Create maps. KA5.1
17. Create analysis report. KA5.2
18. Create tables KA5.3
19. Create charts. KA5.4
20. Distribute digital and hard copy products. KA5.6
21. Organize file structure (e.g. create directories, perform data and directory housekeeping) KA7.2



22. Participate in GIS awareness events such as presentations, conferences and user groups. KA9.5
23. 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	1	3	1	3	3	2	3	3	3	2	3	3	4	2	2	2	2	3	2
B	3	1	3	1	4	3	2	3	3	2	2	3	3	4	3	2	3	2	2	2
C	3	1	3	1	3	3	2	3	3	2	2	3	3	4	3	2	3	2	2	2
D	2	1	2	1	4	3	2	3	3	2	2	3	3	4	4	2	2	2	2	2
E	2	1	2	1	4	3	2	3	3	3	2	3	3	4	2	2	2	2	2	2
F	2	2	2	1	2	3	2	2	2	2	2	3	3	4	3	3	2	3	2	2
G	3	3	3	1	4	3	2	3	3	3	2	3	3	4	3	3	2	3	2	2
H	2	2	2	1	2	3	2	2	3	3	2	3	3	4	2	2	2	2	2	2
I	3	2	3	1	3	3	3	3	3	3	2	3	3	4	2	2	2	2	2	2
J	3	2	3	1	2	3	2	2	3	2	2	3	3	4	2	2	2	2	3	2
K	3	2	3	1	2	3	2	2	3	2	2	3	3	4	2	2	2	2	2	2
L	2	2	2	1	2	3	2	2	3	2	2	3	3	4	2	2	2	2	2	2
M	2	2	2	1	2	3	2	2	3	2	2	3	3	4	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	2	2	3	4	4	3	3			3	3
B	4	4	3	3	4	4	2	2	3	4	4	3	3			3	3
C	4	4	3	3	4	4	2	2	3	4	4	3	3			3	3
D	4	4	3	3	4	4	2	2	3	3	3	3	4			4	3
E	4	4	3	3	4	4	2	2	3	3	3	3	3			3	3
F	4	4	3	3	4	4	2	2	3	3	3	3	3			3	3
G	4	4	3	3	4	4	2	2	3	3	3	3	3	3	3	3	3
H	4	4	3	3	4	4	2	2	3	3	3	3	3			3	3
I	4	4	3	3	4	4	3	2	3	3	3	3	4	3	3	3	3
J	4	4	3	3	4	4	2	2	3	4	3	3	3			3	3
K	4	4	3	3	4	4	2	2	3	3	3	3	3			3	3
L	4	4	3	3	4	4	2	2	3	3	3	3	3			3	3
M	4	4	3	3	4	4	2	2	3	3	3	3	3			3	3

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