

Remote Sensing of Natural Resources

GEOS 5423
University of Arkansas
Spring 2007

Tue 12:30 – 3:20
(Ozark 209)

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Email: adjense@uark.edu
Lab Hours: Tue (3:30 – 5); Wed (9:30 – 11)

Days:	Subject:
Jan 16	<i>Chapter 1 – Remote Sensing and Digital Image Processing</i> ■ Lab #1. Introduction to the Remote Sensing Process
Jan 23	<i>Chapter 2 – Remote Sensing Data Collection</i> ■ Lab #2. Initial Image Information and Display
Jan 30	<i>Chapter 3 – Digital Image Processing Hardware & Software Considerations</i> ■ Lab #3. Data Formats, Contrast Stretching, & Density Slicing
Feb 6	<i>Chapter 4 – Image Quality Assessment & Statistical Evaluation</i> ■ Lab #4. Image Statistics Using the Spatial Modeler
Feb 13	<i>Chapter 5 – Initial Display Alternatives & Scientific Visualization</i> ■ Lab #5. Class Project Lab
Feb 20	<i>Chapter 6 – Electromagnetic Radiation Principles & Radiometric Correction</i> ■ Lab #6. Radiometric Correction – Empirical Line Calibration
Feb 27	<i>Chapter 7 – Geometric Correction</i> ■ Lab #7. Geometric Correction
Mar 6	Midterm Examination ■ Dr. Tullis will be attending an AmericaView meeting; please work on class projects.
Mar 13	<i>Chapter 8 – Image Enhancement</i> ■ Lab #8. Spectral Enhancement: Band Ratioing & Image Filtering
Mar 20	Spring Break (no classes)
Mar 27	<i>Chapter 8 – Image Enhancement (continued)</i> ■ Lab #9. Spectral Enhancement: Image Indices and PCA
Apr 3	<i>Chapter 9 – Thematic Information Extraction: Pattern Recognition</i> ■ Lab #10. Image Classification
Apr 10	<i>Chapter 10 – Thematic Information Extraction Using Artificial Intelligence</i> ■ Lab #11. AI-assisted Classification and Regression
Apr 17	<i>Chapter 12 – Digital Change Detection</i> ■ Lab #12. Class Project Lab
Apr 24	<i>Chapter 13 – Thematic Map Accuracy Assessment</i> ■ Class Project Lab Help Session
May 1	Presentation of Class Projects
May 5	Final Examination on Saturday (May 5, 3:00pm to 5:00pm)

Objective: The course will build on principles of Earth resource remote sensing, with emphasis on the *digital* analysis of remote sensor data.

Text(s): Our class discussions will largely be guided by the following text:

Jensen, John R., 2005, *Introductory Digital Image Processing*, 3rd Ed., Upper Saddle River, NJ: Prentice Hall, 526 pages, ISBN 0-13-145361-0.

Lectures: Lecture materials will be provided at <ftp://ftp.cast.uark.edu/outgoing/tullis/5423/> (our class FTP folder) by the beginning of each class. Additional materials will be provided either as handouts or, if available, in digital format.

Labs: Most major topics will include a laboratory exercise that will be due one week after assigned. You are encouraged to assist your colleagues in laboratory problem solving.

Project: During the first half of the semester, you will be asked to begin working on a digital remote sensing application. I am interested in the significance and quality of your digital image processing. A concise project paper (no more than five pages) describing your logic and results should include references and two pages of graphics. Short presentations on class projects will be given during the week prior to the final exam.

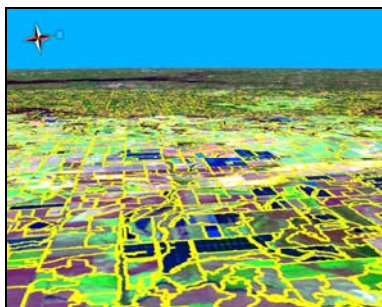
Exams: Exams will be based on material discussed in class and during lab exercises. The format is mostly short answer, true / false, fill-in-the-blank, and matching. A number of equations must be understood with a focus on interpretation (e.g. significance, variable definitions, units, etc). A calculator is not required. The final exam focuses mainly on material discussed after the midterm, but previous concepts may be included.

Method of Evaluation:

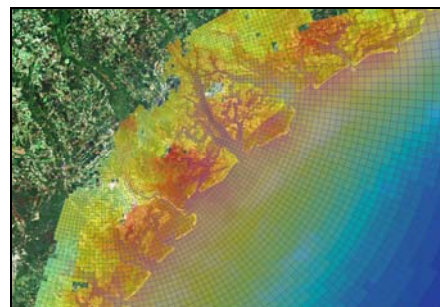
Labs	20 %
Midterm Examination	25 %
Final Examination	25 %
Final Project	<u>30 %</u>
	100%

Weather: If Fayetteville Public Schools are closed, class is cancelled.

Syllabus: Changes to the syllabus may occur during the semester. In this case, an updated PDF version of the syllabus will be announced and provided.



Segmentation of 30×30 m Landsat 5 TM imagery acquired in Summer 2004 over the "Delta" region of Eastern Arkansas. The bright blue rectangles are recently developed aquaculture ponds.



This telescoping hyperbolic grid over a portion of the Atlantic seaboard displays modeled storm surge heights above sea level based on 0.7 m nominal posting LIDAR-derived ground elevations.