GEO 4412 – DIGITAL REMOTE SENSING
TEXAS STATE UNIVERSITY*, SPRING 2009

Instructor: Mark A. Fonstad
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Office Hours: 12:00 PM – 2:00 PM Wednesdays or by appointment
Class Time: 2:00 PM – 3:15 PM Mondays and Wednesdays
Classroom: Evans Liberal Arts (ELA) Building, Room 315
Course Line Number: 342263
Course Laboratory: Mondays 3:30pm – 5:20pm, Course number 342263. ELA 149. Laboratory Instructor: ***Jiao Wang***, Office: ELA 389, 512-245-1935, Email: jw1501@txstate.edu, Office hours: 3:30pm – 5:00pm Wednesdays.

COURSE DESCRIPTION

Introduction to the digital image processing of satellite scenes including restoration, enhancement, classification, change detection, and mapping for environmental monitoring and inventorying. Prerequisite: GEO 3416.

Students will focus on Geographic applications of the principles and practices of digital image processing, classification, and modeling using satellite images. Prerequisite: GEO 4412 or equivalent.

LEARNING OUTCOMES

Students are expected to demonstrate a theoretical and applied knowledge of digital remote sensing concepts and skills as outlined below.

Knowledge Outcomes

1. Students will learn principles of digital remote sensing, including radiometric and geometric correction.
2. Students will learn image enhancement techniques and techniques of unsupervised and supervised classification.

Skills Outcomes

3. Students will obtain, enhance, and classify digital images with a variety of scales.
4. Students will construct map layouts using satellite images that demonstrate human-environment interaction.

The Department of Geography's Student Learning Outcomes for all departmental programs may be reviewed at: http://uweb.txstate.edu/~mc12/LOSIndex.htm.

REQUIRED MATERIALS

Introductory Digital Image Processing, 3rd ed. by J.R. Jensen. Prentice Hall. University Bookstore.

EVALUATION AND GRADING POLICIES

I will evaluate your performance and assign grades based on four major areas of work in this course. First, I will assess your ability to understand course material through laboratory exercises. Second, there are two exams (one midterm and one final) also used to evaluate your final grade. Third, students will complete a final project on digital remote sensing due near the end of the term. All students are expected to prepare assignments by the time specified when you begin the lab. **Late assignments** (laboratories or project) will have their grade lowered 10 percent of the maximum points for that assignment per class day late. I will endeavor to grade projects within a week of their submission.

All students are expected to take exams at the scheduled time. **Make up exams** will be given to students who have excused absences; however, make up exams will have different questions than those given at the scheduled time (though the content will be the same), and make up exams for students with unexcused absences will be given on the same day as the Final Exam. Exams should be returned to students within one week of the exam date.

There is a maximum of 500 points for all of the lecture exams, laboratory exercises, and final project. The basis for grading will be as follows: 100 points (20%) for the midterm examination, 75 points (15%) for the final examination, 125 points (25%) for the final project, and 200 points (40%) for the laboratory section grade.

The final grades will be determined based on the following rules:

A	≥90% (≥450 points)
B	≥80% and <90% (400 – 449 points)
C	≥70% and <80% (350 – 399 points)
D	≥60% and <70% (300 – 349 points)
F	<60% (< 300 points)

CLASSROOM AND ATTENDANCE POLICIES

Attendance is required at all lectures and labs. Good attendance in the class is key to your success in this course. First, the lectures and labs will require knowledge from previous weeks. Second, the individual projects will require a deep familiarity with class material.

If you must miss class because of an illness, a personal emergency, or some other extenuating circumstance, please contact me as soon as possible so I can make alternative arrangements for you (this is key). Of course, good attendance means more than just showing up for class. Please read and adhere to the policy on classroom etiquette that appears below. These codes of conduct will allow everyone to participate equally as learners. Thank you for your cooperation.

In the Department of Geography, instructors strive to create an atmosphere of mutual trust and respect in which learning, debate, and intellectual growth can thrive. Creating this atmosphere, however, requires that instructors and students work to achieve a classroom in which learning is not disrupted. At the most basic level, this means that everyone should attend class, be prepared with readings and assignments completed, and that students pay attention. This means no conversations with friends, reading the newspaper, coming late, or leaving early. Such behavior is disruptive to the instructor and to your fellow classmates.

STUDENTS WITH DISABILITIES

Students having special needs/disabilities (as documented by the Office of Disability Services) that will require compensatory arrangements must contact the instructor no later than the fourth class period to discuss specific arrangements and logistics. Students who have not already done so will be required to contact the Office of Disability Services located at LBJ 5-5.1 (512-245-3451). Texas State is dedicated to providing these students with necessary academic adjustments and auxiliary aids to facilitate their participation and performance in the classroom.

TEXAS STATE UNIVERSITY HONOR CODE

Learning and teaching take place best in an atmosphere of intellectual fair-minded openness. All members of the academic community are responsible for supporting freedom and openness through rigorous personal standards of honesty and fairness. Plagiarism and other forms of academic dishonesty undermine the very purpose of the university and diminish the value of an education. Specific sanctions for academic dishonesty are outlined in the *Texas State Student Handbook.*

Tentative Course Schedule

Schedule	Topics & Events	Readings	Laboratory
Jan. 21st	Course Introduction	Chapter 1	**No Lab**
Jan. 26th, 28th	The RS Process	Chapters 1 & 2	Introduction to ERDAS Imagine
Feb. 2nd, 4th	Image Statistics & Display	Chapters 4 & 5	Display Manipulation
Feb. 9th, 11th	Image Enhancement	Chapter 8	Modeler, Image Enhancement
Feb. 16th, 18th	Radiometric & Geometric Correction	Chapters 6 & 7	Mosaicing & visualization
Feb. 23rd, 25th	Image Indices, PCA	Chapter 8	Vegetation Indices and Analysis
Mar 2nd, 4th	Classification Schemes, **MIDTERM EXAM (Wed)**	Chapter 9	Map Composition & Layout
Mar 9th, 11th	Classification	Chapter 9	"Digital Camera" Lab
Mar 16th, 18th	**SPRING BREAK**		**No Lab**
Mar 23rd, 25th	**AAG (No Classes)**	Chapter 9	**No Lab**
Mar 30th, Apr 1st	Classification	Chapter 9	San Marcos Area Classification
Apr 6th, 8th	Accuracy Assessment	Chapter 13	Urban Change Detection
Apr 13th, 15th	Change Detection	Chapter 12	Lake Change Detection
Apr 20th, 22nd	Change Detection	Chapter 12	Project Time
Apr 27th, 29th	Adv. Change Detection	Chapter 11	Project Time
May 4th	New RS Advances	Chapter 11	Project Time
May 11th	**FINAL EXAM, 2:00 p.m. – 4:30 p.m.**		**No Lab**

ABOUT THE INSTRUCTOR

The instructor is Mark A. Fonstad, associate professor of geography. He is a specialist in spatial and hydrological analysis of river systems, applied remote sensing, and theoretical geomorphology. For the past eight years, Mark has directed the field research on watershed hydrology, channel morphology, and the remote sensing of rivers in Yellowstone National Park.

* A member of the Texas State University System