

**NREM 345**  
**Natural Resource Photogrammetry and Geographic Information Systems**  
**Fall, 2005**

MW 8—233 Sci II, F8-11—233 Sci II

Instructor: Steven E. Jungst  
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Prereq: Junior classification. Use of aerial photos and remotely sensed imagery in resource management. Training in techniques of photo measurement, interpretation, use of geographic information systems (GIS). Principles of remote sensing.

**Course Requirements**

--Students are expected to attend all classes unless approval for absence has been obtained from the instructor prior to the absence.

--Make up exams will be given only if an excused absence has been granted.

--All lab assignments are due **at the beginning** of the following lab period unless otherwise indicated by the instructor. Assignments not turned in when due will be counted late immediately, and docked 10%. An additional 10% reduction in score will occur for every additional day the assignment is late.

--You will need to purchase a limited amount of supplies from the bookstore. Some of those supplies will be used throughout the semester, and others will only be used for GIS (See List of Supplies).

**Texts**

--Aerial Photography and Image Interpretation for Resource Management -- David Paine Publisher: John Wiley

**Course Grades**

Distribution of points is as follows:

2-hour exams	200 Points
1 skills exam	100 Points
1 Final Exam	100 Points
Notebook	10 Points
<u>Lab Assignments</u>	<u>120 Points</u>
Total	530 Points

Grades will be assigned based on your achievements in the course as reflected by the following scale.

<b><u>Percentage</u></b>	<b><u>Points</u></b>	<b><u>Grade</u></b>
93.3 - 100%	494-530	A
89.9 - 93.2%	477-493	A-
86.6 - 89.8%	458-476	B+
83.2 - 86.5%	441-457	B
80.0 - 83.1%	424-440	B-
76.5 - 79.9%	405-423	C+
73.3 - 76.4%	388-404	C
69.9 - 73.2%	371-387	C-
66.6 - 69.8%	352-370	D+
63.2 - 66.5%	335-351	D
60.0 - 63.1%	318-334	D-
< 60.0%	<318	F

**Student Academic Accommodation Requests**

Iowa State University complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. Any student who has a Student Academic Accommodation Request form (SAAR) from the Disability Resources

Office should present that form to the instructor during the first week of class, or as soon as the condition is documented. Retroactive accommodations will not be provided in this class.

### Forestry and Animal Ecology Student Learning Outcomes

This course provides some of the knowledge and skills you will need to accomplish the following departmental learning outcomes:

- Work effectively both individually and with others on complex value-laden natural resource problems that require holistic problem solving approaches
- Recognize and interpret resource problems across spatial scales from local to global
- Exercise life-long learning skills developed before graduation

### NREM 345 Course Goals and Expected Student Outcomes

After studying class notes, reading assignments, and completing laboratory problems for the course, students are expected to be able to accomplish all of the outcomes listed after each course goal.

**Goal 1:** Develop the understanding and skills necessary for accurate measurement of direction, distance, area and height from aerial photos.

- explain technical terms used in association with aerial photos
- decide which scale determination technique is most appropriate for a given situation.
- obtain necessary information required to calculate scale for a vertical aerial photo.
- assess the impact of scale change on accuracy of measurements taken on photos
- determine distance, direction, area and height from aerial photos using techniques appropriate for a given situation.

**Goal 2:** Introduce concepts necessary for successful photo interpretation

- describe the steps in successful photo interpretation.
- apply measurement skills and convergence of evidence in order to interpret successfully the images contained on an aerial photo.

**Goal 3:** Introduce the use of GIS and GPS for analysis for spatial data and map making

- explain the sub-systems necessary for a functioning GIS
- describe the difference between raster and vector GIS and explain the advantages and disadvantages of both.
- enter graphic and tabular data into a GIS using ArcGIS
- use ArcGIS and associated GIS themes to support land management decisions.
- produce a map of an area using ArcGIS.
- Give a basic explanation of how GPS functions to provide the user with accurate locations

<u>Date</u>	<u>Subject</u>	<u>Reading Assignment*</u>
8/22	Introduction: Goals, procedures, handouts	Ch 1, 3 & 15 or 16 or 17 or 18
8/24	Kinds of imagery	pp. 21-29
8/26	Eye testing, nomenclature, stereo viewing	
8/29	Scale calculation	Ch. 4 & pp. 81-84
8/31	Area Determination	PP. 91-96
9/1	Scale determination, linear measurements	
9/5	<b>University Holiday</b>	
9/7	Scale, measurement devices and accuracy	
9/9	Area Determination	
9/12	Displacement & Distortion in vertical & oblique photos	pp. 29-38, 130-131

9/14	Solar altitude, hot spots, and no shadow point	pp. 113, 114
9/16	Height determination by displacement & shadows	
9/19	Height determination by parallax	pp. 131-155
9/21	<b>EXAM I</b>	
9/23	Height determination by parallax	
9/26	Interpreting aerial photos for ground cover	
9/28	Photo sampling for ground cover	
9/30	Photo sampling for ground cover	
10/3	Ground truth	
10/5	Field inventory plot locations	Handout
10/7	<b>SKILLS EXAM</b>	
10/10	Introduction to GIS	<a href="http://www.gis.com/whatisgis/index.html">http://www.gis.com/whatisgis/index.html</a>
10/12	Introduction to GIS	(What is GIS, How to Use GIS, How to do
10/14	Intro to ArcGIS (Basic operations)	GIS analysis, Why use GIS)
10/17	Communicating with maps	
10/19	Creating map layouts in ArcGIS	
10/21	Making an effective GIS map	
10/24	GIS attribute tables and calculating new attribute values	
10/26	Entering data via heads-up digitizing on the screen	
10/28	GIS Problem (completing the Boone West Quad roads)	
10/31	Attribute queries	
11/2	<b>Exam II</b>	
11/4	GIS Problem using calculations and queries (gravel and forest owners)	
11/7	Scanned images and event themes as input to GIS	
11/9	Orthophotos vs. regular vertical aerial photos	
11/11	Registering a scanned image and digitizing	
11/14	Raster based GIS	
11/16	Raster based GIS and DEM's	
11/18	Creating surfaces and contours from a DEM	
<b>11/21-11/25 Thanksgiving Break</b>		
11/28	Individual GIS project	
11/30	Individual GIS project	
12/2	Individual GIS project for review	
12/5	GPS	<a href="http://www.aero.org/publications/GPSPRIMER/index.html">http://www.aero.org/publications/GPSPRIMER/index.html</a>
12/7	GPS	
12/9	GPS demonstration lab	
12/12	FINAL EXAM WEEK BEGINS. Notebooks due at the beginning of Final Exam Period	

\*All assignments in Paine unless otherwise noted.

**The above schedule and procedures are subject to change in the event of extenuating circumstances.**