SYLLABUS--GEOGRAPHY (GEOG) 403 (U/G, 4 credits)
REMOTE SENSING: Environmental and Land Use Analysis
Spring 2008

Lecture: Tuesday-Thursday 11:00 a.m.-12:15 p.m. (BOL B95)
Lab: Tuesday, Wednesday, or Thursday 1:00-2:50 p.m. (BOL 435 or BOL 296)
Instructor: Prof. Mark D. Schwartz, Ph.D. Email: mds@uwm.edu
Office: BOL 490 -- messages may be left in BOL 410 (Geography Department)
Office Phone: 414-229-3740 Messages: 414-229-4866 (Geography Department)
Office Hours: by appointment only
Class Reflector: geog-403@uwm.edu

Materials: see Lab syllabus

This course is designed to explore basic applications of remotely-sensed data in the evaluation of geographical problems. Material regarding the theories and principles of remote sensing, types of sensors, and analysis of remote sensing data will be addressed, along with specific applications to atmospheric, geophysical, biological, and cultural patterns. In addition, the student will become familiar with image processing functions of the IDRISI software, and be introduced to ERDAS IMAGINE (advanced image processing software). More information is available at http://www.uwm.edu/Course/416-403/

**COURSE POLICIES**

1. Evaluation (undergraduates and graduates will be evaluated separately)

   **UNDERGRADUATES:** Grades will be assigned on the basis of the total points accumulated from tests, lab exercises, and discussion/participation throughout the semester (530 possible). These will consist of 3 equally weighted exams (100 points each), lab exercises (total of 200 points), and discussion/participation, including lecture attendance (total of 30 points).

   **GRADUATE STUDENTS:** In addition to the above requirements, graduate students will prepare a 10 page (2500 word minimum) paper with at least one publication quality color figure on a project using remote sensing in a geographic application, and a short talk (about 10 minutes) about their project that will be presented to the class. These will be worth 50 and 20 points, respectively. Therefore graduate students will be graded based on 600 points.

   The percentages necessary to receive certain grades will be no higher than the following:

   
<table>
<thead>
<tr>
<th>Percentages</th>
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<tr>
<td>88%--(A-)</td>
<td>78%--(B-)</td>
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<tr>
<td>68%--(C-)</td>
<td>58%--(D-)</td>
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2. Notices: Grades, once given, are final except in cases of clerical error. Do not use a red pencil or pen to write exam answers. All tests must be taken as scheduled; make-ups are given in case of documented student illness or other emergency only. It is the responsibility of the student to notify the instructor when an exam or other course requirement will be missed. If you need special accommodations in order to meet any of the requirements of this course, please contact me as soon as possible. Do your own work...plagiarism and cheating are unacceptable and will not be tolerated. Additional information regarding the policies and procedures applicable to this course are available on-line (http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf) and posted in the Geography Dept. main office, BOL410.
TENTATIVE LECTURE SCHEDULE and Readings

Text Chapters (Jensen)

Jan.  
22-T-Introduction and course procedures  
Basics and History of Remote Sensing  1,3  
24-R-Cameras, Films, and Filters  4  
Characteristics of Images and Scale 5  
Fundamentals of Image Interpretation  6  
29-T-Fundamentals of Image Interpretation (continued)  
31-R-Fundamentals of Image Interpretation (continued)  
Applications of Aerial photographs

Feb.  
5-T-Electromagnetic Radiation and Radiation Laws  2 (pp.37-47)  
7-R-Radiation, Emission, and Reflection  2 (pp.47-60)  
12-T-Satellite Basics  15  
14-R-LANDSAT Thematic mapper and SPOT  7  
19-T-Introduction to Windows and IDRISI

21-R-EXAM ONE

26-T-Review Exam One, Image Processing with IDRISI  
28-R-Image Processing with IDRISI (continued)  

Mar.  
4-T-Image Processing with IDRISI (continued)  
6-R-Passive Scanners, Thermal and Microwave  8  
11-T-Radar, SLAR, and LIDAR  9, 10  
13-R-Geographic Information Systems and Image Georegistration  
18-T and 20-R-NO CLASS--SPRING BREAK

25-T-Introduction to ERDAS  
27-R-Introduction to ERDAS (continued)  

Apr.  
1-T-Weather and Climate Applications  12 (pp.427-437)  
3-R-EXAM TWO

8-T-Review Exam Two, Weather and Climate Applications (continued)  
10-R-Weather and Climate Applications (continued)  
15-T-Limnological Applications (Guest Lecture)  12 (pp. 409-427, 437-439)  
17-R-Geomorphology Applications (Guest Lecture)  14 (pp.529-566)  
22-T-Archaeological Applications (Guest Lecture)  
24-R-Urban Applications (Guest Lecture)  13  
29-T-Geological and Soil Applications  14 (pp.507-528)  

May  
1-R-Agricultural, Forestry, and Resource Applications  11  
6-T-Graduate Student Presentations  
8-R-Graduate Student Presentations, Course Review and Evaluations  
13-Tuesday-EXAM THREE- 10:00 a.m. - 12:00 noon
Laboratory Schedule

Note: Lab meetings are in BOL 296 unless otherwise noted!

January

22-24-Lab #1 Introduction to Image Interpretation. (BOL 435, 10 points)
29-31-Lab #2 Air Photos as Quantitative Data (BOL 435, 25 points)

February

5- 7-Lab #2 continued (BOL 435)
12-14-Lab #3 E-M Emission and Multi-spectral Reflectance (BOL 435, 15 pnts.)
19-21-Open Labs this week, IDRISI Orientation
26-28-Lab #4 Introduction to IDRISI (20 points)

March

4- 6-Lab #5 Image Processing with IDRISI (30 points)
11-13-Lab #6 Thermal and Microwave Remote Sensing (15 points)

18-20-NO CLASS--SPRING BREAK

25-27-Open Labs this week

April

1- 3-Lab #7 GIS applications (20 points)
8-10-Lab #8 Urban and Land Use (20 points)
15-17-Lab #9 Weather and Climate (15 points)
22-24-Lab #10 Agriculture and Forestry (15 points)
29-May 1-Lab #11 Geology and Soils (15 points)

May

6- 8-Open Labs this week