

GEOG 483/583
Remote Sensing/GIS Integration
Spring 2009

(GEOG 583 registrants: be sure to also obtain a copy of the “extras” required for 583 credit)

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Course Objectives

- To review and expand concepts related to the acquisition and quantitative analysis of remotely sensed data
- To learn *concepts and tools* for:
 - processing, analysis, and interpretation of satellite and aircraft-based imagery
 - integration and analysis of remotely sensed data and other data types within Geographic Information Systems

Pre- or Co-requisites

- FOR 472 or other introduction to principles and applications of remote sensing, sensor systems (grad students: this requirement is waived if you are willing to do some background reading)
- GEOG 385 (GIS Primer) or equivalent
- STAT 251 or other intro statistics course

Texts

A note about editions of remote sensing-related textbooks: The portions of textbooks that cover basic principles do not change much over time, but portions of textbooks which cover specific sensors and some applications and analysis techniques do change frequently! Beware of using an edition of a textbook that is more than about 5 years old, except for the sections on basic physical concepts.

Required Text:

Introductory Digital Image Processing: A Remote Sensing Perspective by John R. Jensen, 3rd edition, 2005, Prentice-Hall, Inc. (I will sometimes refer to this as the “Jensen green text”)

Recommended for additional background (on reserve at the library):

Remote Sensing of the Environment: An Earth Resource Perspective by John R. Jensen, 2nd edition, 2007, Prentice-Hall, Inc. (I will sometimes refer to this as the “Jensen blue text”)

This book (Jensen blue text) is used as a required text for two other university courses (FOR 375 and FOR 472), so you may be able to borrow a copy from another student or get a used copy for the

semester and then resell it later. If you have taken an intro remote sensing course elsewhere you might have used another very suitable intro text (there are at least 3-4 good ones out there). There is a bit of overlap between the two Jensen texts:

- Chap 1 of both texts are very similar and are good overview/intros to RS
- Chap 2 in the blue text gives a good overview of basic physical principles. Some of these are included in Chap 6 of the green text (and we'll cover the important ones), but if you have not had the pre-req class, you should read this chapter carefully
- Green text Chap 2 goes into specific sensors, and the blue text Chap 7 is very similar, but a bit more updated
- Chap 7-14 in the blue text provide excellent overviews on applications of remote sensing data from different portions of the electromagnetic spectrum – I recommend skimming these if you have not had a recent course such as FOR 472
- Chap 15 in blue text on in-situ measurements (we'll cover some of this in our course)

Software tools we'll be using

In the first two-thirds of the semester we focus on the concepts and tools related to image processing. For this work, we will primarily use the image processing package called ERDAS/Imagine version 9.2. In the latter third of the semester, when we begin to integrate remote sensing (RS) data with other data types, we will use Arc products. Unlike Arc products, for which the university holds unlimited site licenses, ERDAS/Imagine is only available in special research and teaching labs. McClure Hall Room 206 and the CNR Remote Sensing/GIS lab are the only teaching labs in which ERDAS/Imagine is available.

We also have available in our lab (and you may use in your class projects if you so chose) several licenses for the ENVI image processing package.

Class format

During most weeks of the semester, I will lecture on Tuesdays, and the Thursday session will be for the purpose of carrying out the lab exercises. There will be a few exceptions to this throughout the semester, all of which will be announced in advance and reflected in the class schedule on our web page. For example, I will miss several classes due to travel to scientific meetings.

In prior years, the past professor (Dr. Karen Humes) blocked out 2 hours EACH on Tuesday and Thursdays, but the registrar's office has given us a hard time about such schedules in recent years. There will be a handful of weeks during the semester in which it would be very valuable for us to have two hours of lecture time. If you can avoid scheduling anything before 2:30 on T/Th, please do.

Weekly schedule

Please see the separate file (available under the "Course Info" portion of our web page) for the targeted weekly schedule. I will notify you whenever this file is updated and the revision date is always posted at the top of the sheet.

Computer Lab Exercises

In response to student feedback in the past, we have set up a regularly scheduled time for you to do lab exercises. The TA will be here during those times and sometimes I will be as well. If you already have experience in image analysis and/or the Imagine software, you are quite welcome to do the labs on your own at other times (see note below about availability of Room 206 at other times). Of course, it is not

reasonable to expect individual tutoring at other times if you choose not to attend the lab sessions.

You may work individually or in pairs on the lab exercises. If you work in pairs to do the exercises – you still need to turn in individual written responses for grading. On your paper, list the name of the person with whom you worked for that lab.

If you have access to another teaching lab (e.g., the CNR lab) or a research lab with Imagine, you are also welcome to do the lab exercises there. All of the data you need to do the exercises are either: a) in the “examples” portion of the ERDAS files present in a default ERDAS installation or b) provided for you on Blackboard for you to download.

The lab exercises are all posted on the class web page. You will have a quota of printed pages you can print out here in our lab (a few of the exercises require that you print out some analysis products), and you can occasionally print out the weekly exercise when you arrive at the lab. However, things will go more smoothly and you’ll get to work more quickly on your exercises each week if you print out the week’s exercise before arriving at lab.

Lab exercises are generally due one week after assignment. There are exceptions, however. Please see the exercise for the due date.

Availability of Room 206 for Student Use and Some Rules

Your student ID cards will serve as keys to let you into the 206 labs on an unlimited basis. *There are three other classes using the room this semester – if you plan to come use the lab outside of our class hours, be sure to check the availability on the list posted on the doors.* Note that if you want card access to McClure Hall (building is locked after regular hours), please see Loanne Meyer (loannem@uidaho.edu).

If computer access in this lab gets to be a problem, we will institute a sign-up procedure. Please keep the TA and me informed if computer access in Room 206 gets to be a problem/issue.

In exchange for unlimited access to our room and building, you must treat your student ID as you would a credit card in terms of security. If your card is lost or stolen, please notify both our admin assistant (Loanne Meyer; loannem@uidaho.edu) and me so that we get your id removed from our system ASAP.

You will have a username and password to log on to the computers in this room. In addition to allowing use of the computers, it allows you access to the server for this lab (name = rslserv) on which you will have some disk space allocated to you for the entire semester. Most of the exercises in the first half of the semester do not require that you save data files onto disk. (You only turn in the hardcopy of your weekly exercise, with your responses to the questions.) You will use this server disk space when you are working on exercises in the latter parts of the semester and on your class projects.

DO NOT write anything other than temporary files to the hard drives on these computers – they will be purged weekly.

Also, starting around Exercise 5 or 6, you will want to plan to bring a CD or USB storage device to lab to back-up some of your work. The server is backed up on a regular basis, but it will be quicker and easier for you to recover any lost work if you have it written on your own media.

Please keep lab clean and neat. Do not leave printouts or other papers around (please recycle them). Do not bring food or drink into the lab; they can damage the computer equipment.

Lab computers are for class work only. Do not abuse their use with extraneous web surfing, hacking, et cetera. See www.uiweb.uidaho.edu/policy for UI's policy on the use of UI computers.

Class communication

Class exercises, project guidelines, calendar, gradebook and SOME class notes (not all) will be available on our Blackboard class web page (www.blackboard.uidaho.edu).

I will occasionally send out email announcements or reminders about important class events. VandalWeb only provides me with uidaho email addresses, so please let me know if you prefer for me to use a different address you check more frequently.

If you have any questions or concerns about the class at any point in the semester, please do not hesitate to communicate them to me or to the TA. We both have office hours noted above. Please see us during these times or by appointment.

Grades

Points will be allocated throughout the semester according to the following plan:

2 Exams (100 pts each)	200 pts
Lab exercises	150 pts
Class project	150 pts

Total:	500 pts

Because this class is typically comprised of highly motivated juniors, seniors, and graduate students, past classes have typically not had to curve letter grades at all (i.e., 90% of more of possible points = A; 80% or more = B, etc.)

Exam Policies

- 1) Exact dates for exams will be confirmed at least one week in advance of exam and there will be a list of "Study Tips" for each exam.
- 2) Only in cases of serious illness by you or immediate family members, serious unavoidable schedule conflicts, or events falling into the UI policy on religious holidays will you be able to make special arrangements with me to take an exam at time different from the rest of the class. In order to do this, you **must** notify me in **advance** of the exam (voice mail available 24 hours/day or email) and you must provide proof of serious illness or schedule conflict.

Lab Exercise Policies

- 1) You may work on computer-based exercises either individually or in pairs, but each person must write up and turn in the assignment individually. If you worked in a pair, please indicate on the assignment the name of your partner.
- 2) For full credit, lab exercises must be turned in at the beginning of the lab or class period assigned as the due date.

- 3) After that time, assignments are considered late. You may turn in assignments up to one week late and receive half credit. After that, no credit is given.
- 4) Exceptions to late policy will be made only for circumstances described above under exam policy. Again, you MUST notify me in advance of the due date in order to have any possibility of making such arrangements.

Class Projects

See separate document for information about the class project.

Academic dishonesty

Cheating or plagiarism will not be tolerated. Your work must be your own. Do not copy or plagiarize the work of others. If you are caught, you will receive no credit for that work, whether it is a homework assignment or an exam, and you will be referred to the Dean of Students for further disciplinary action. Depending on the seriousness of the offense, you could be expelled from the university. I encourage you to discuss homework assignments and projects, but you must do your own work. The University of Idaho's policy on cheating is described in Article II of the UI Student Handbook or at <http://www.students.uidaho.edu/default.aspx?pid=56186>.

An aspect of plagiarism is not citing use of figures, images, and photo (as well as not citing quoted text). Please include appropriate citations and/or web addresses in your presentations and papers.

Additional information

Reasonable accommodations are available for students who have a documented disability. Please notify the instructor during the first week of class of any accommodation(s) needed for the course. Late notification may mean that requested accommodations might not be available. All accommodations must be approved through Disability Support Services located in the Idaho Commons Building, Room 333. Disability Support services can be contacted at 885-7200, email at dss@uidaho.edu, and via their website at www.access.uidaho.edu or www.webs.uidaho.edu/aap.