REMOTE SENSING II – GEOG 486/586

Spring 2013 Term, University of Oregon
Course Registration Number: GEOG 486 – 37251, GEOG 586 -- 37252
Lecture: 11:00am – 11:50am Tuesday & Thursdays, 185 Lillis
Lab: 12:00pm – 1:50pm Tuesdays, 442 McKenzie (SSIL Lab)
Instructor, Mark Fonstad, Condon 107F, fonstad@uoregon.edu, 541-346-4208
Instructor Office Hours: 10:00am – 10:50am Tuesdays and Thursdays
GTF: James Dietrich, Condon 105, jdietric@uoregon.edu, 541-346-4564
GTF Office Hours: 1:30pm – 2:30pm Thursdays, SSIL Lab

This course provides the theoretical background and digital image processing techniques for using remotely sensed imagery to analyze and interpret geographic and environmental patterns and change. Topics covered include image classification and accuracy assessment, preprocessing of remote sensing data, techniques for detecting and characterizing geographic change, data processing for advanced sensors such as hyperspectral remote sensing. This course also emphasizes the digital image processing techniques for specific topical specialties such as plant sciences, land use and land cover change, hydrospheric sciences, and geologic mapping. In addition, students will be exposed to fundamental questions such as the roles of remote sensing in society, the nature of error in mapping, and the use of remote sensing data in general geographic applications.

REQUIRED READINGS

The required textbook for this class is: Campbell, J.B. and Wynne, R.H. 2011. Introduction to Remote Sensing (5th Edition). New York. The Guilford Press. 667 p. It incorporates many changes and additions from the previous editions, so make sure you have this 5th edition. In addition, graduate students will be assigned one significant technical article per week from the latest issue journals such as *Remote Sensing of Environment* that relates to that week's lab, and the grad students will integrate that article's basic findings into their lab writeup.

REQUIRED BACKGROUND

To enroll in this class you must have taken GEOG 485/585: Remote Sensing I. If you have not taken GEOG 485/585 or do not have the consent of the instructor, you should withdraw from this class.

GRADES

There will be two exams in the class (a midterm and a final exam), each worth 25% of your total grade. Neither are open-note/open-book. Labs will make up the remaining 50% of the grade. Labs by graduate students will be graded at a higher standard associated with the additional technical readings they will incorporate into their lab writeups. The final grade scale is as follows: A: 90-100; B: 80-89; C: 70-79; D: 60-69; F: <60.

LABS AND LAB GRADES

Labs provide practical experience that is typical of what you will encounter on most any remote sensing project. Laboratory sessions will be in SSIL. I really want you to work with one another on these assignments in order to exchange knowledge with your partners. However, you should complete your own work and turn in your own work for grading. You are encouraged to collaborate on labs with other teams and help one another out, but do not copy each others' written answers. I expect all answers to be written in complete sentences with all words correctly spelled.

Labs must be turned in digitally on Blackboard according to the deadlines on the syllabus -- otherwise you will receive a ZERO on the assignment unless you have made arrangements with me beforehand. It is essential that you complete the labs because many of them are sequential and build on knowledge you have gained from the previous lab.

Always bring a USB flash drive to lab to back up your work at the end of class. The shared drives at SSIL will be available to you, but it is always good to have a backup nonetheless.

ACADEMIC DISHONESTY

I *will not* tolerate cheating or academic misconduct/dishonesty in my courses; examples of these behaviors include (but are not limited to):

- Plagiarism (passing off the work of another as that of your own)
- Copying answers from your neighbors during exams/activities
- Dishonesty concerning reasons for absence from class
- Any other actions that might give you an unfair advantage over your classmates.

All cases of academic dishonesty/misconduct will be referred immediately to the Student Judicial Affairs Office. The penalties for engaging in academic dishonesty and/or misconduct can range from a grade of "F" for an assignment to an automatic failure of the course. Please consult the university policy at http://studentlife.uoregon.edu/judicial/conduct/sai.htm.

LATE/MAKE-UP WORK

Late labs will not be accepted and make-up work will not be assigned, except in extreme circumstances and where you have documentation (i.e. doctor's note). If you must miss a lab section or exam due to illness or other unavoidable circumstances, you **MUST** notify the instructor prior to missing if possible.

DISABILITY SERVICES NOTICE

I work hard to ensure a quality learning experience for all students. If you need specific accommodations to get the most out of this class, please let me know by (1) informing me of your particular needs, and (2) providing the appropriate documentation from the campus learning services office. I will make every effort to accommodate your needs, but you must notify me by the first week of class if you need special arrangements.

NOTE: I consider this syllabus a contract between myself and the students in this course. In writing this syllabus, I have obligated myself to follow the policies and procedures contained herein. You are responsible for understanding and following these policies as well. I reserve the right to make changes to this syllabus. You will receive verbal and written notification of major changes to course policies, procedures and content.

TENTATIVE SCHEDULE

Week 1 (April 2, 4)

Tuesday Lecture: Introduction and Preprocessing (Ch. 11)
Thursday Lecture: Field Data (Ch. 13) and Accuracy Assessment (Ch. 14)
LAB 1 – Supervised Classification and Field Data

Week 2 (April 9, 11)

Tuesday Lecture: Ground "Truth" Data collection (Ch. 13)
Thursday Lecture: Photogrammetry (Ch. 3)
LAB 1 – Supervised Classification and Field Data (Lab due April 16, 10am)

Week 3 (April 16, 18)

Tuesday Lecture: Microwave Imaging (Ch. 7)
Thursday Lecture: Thermal Imaging (Ch. 9)
LAB 2 – Structure from Motion (Lab due April 23, 10am)

Week 4 (April 23, 25)
Tuesday Lecture: Hyperspectral Imaging (Ch. 15)
Thursday Lecture: Change Detection (Ch. 16)
LAB 3 – Hyperspectral Remote Sensing

Week 5 (April 30, May 2)
Tuesday Lecture: Change Detection (Ch. 16)
Thursday: MIDTERM EXAM
LAB 3 – Hyperspectral Remote Sensing (Lab due May 7, 10am)

Week 6 (May 7, 9)
Tuesday Lecture: Land Use and Land Cover (Ch. 20)
Thursday Lecture: Land Use and Land Cover (Ch. 20)
LAB 4 – Change Detection

Week 7 (May 14, 16)
Tuesday Lecture: Plant Sciences (Ch. 17)
Thursday Lecture: Plant Sciences (Ch. 17)
LAB 4 – Change Detection (Lab due May 21, 10am)

Week 8 (May 21, 23)
Tuesday Lecture: Hydrospheric Sciences (Ch. 19)
Thursday Lecture: Hydrospheric Sciences (Ch. 19)
LAB 5 – Landsat Vegetation and Hydrology (Lab due May 28, 10am)

Week 9 (May 28, 30)
Tuesday Lecture: Earth Sciences (Ch. 18)
Thursday Lecture: Earth Sciences (Ch. 18)
LAB 6 – Global Remote Sensing & MODIS

Week 10 (June 4, 6)
Tuesday Lecture: Global Remote Sensing (Ch. 21)
Thursday Lecture: Global Remote Sensing (Ch. 21)
LAB 6 – Global Remote Sensing & MODIS (Lab due June 7, 5pm)

June 10, 8:00am FINAL EXAM