

GEOM 3002
CRN 32688

Air Photo Interpretation and Remote Sensing

Fall 2014

Instructor Doug King, Loeb B351
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Office Hours Thursday 9:30-11:30 or during the labs. Please drop by or e-mail me to set an appointment.

T.A. TBA

Schedule Two-hour lecture and two-hour laboratory
Details to be presented in the first lecture.

Prerequisite

GEOM 1004, OR third year standing, OR permission of department. Students without these should see me after the 1st class to discuss.

Some understanding on the part of the student of spatial patterns on the Earth's surface and of maps and scales is assumed. Basic mathematics and statistics background is beneficial. Some use of calculators is required in labs and exams.

Objectives / Summary

Lectures provide the conceptual and technical background related to image formation and spectral reflectance theory, visual interpretation of images, image enhancement, types of remote sensors currently in use, thematic mapping using remotely sensed imagery, and other applications of remote sensing. Labs offer an opportunity for students to apply these concepts and techniques in visual and computer-based identification, interpretation and mapping of Earth surface landforms and materials, urban environments, and land use/land cover mapping using aerial photographs and digital satellite imagery. This course provides a foundation for GEOM 4003W, Remote Sensing of the Environment, an analytical digital image analysis course where quantitative modelling and thematic mapping techniques are presented for the major applications of remote sensing.

Course Contents

a) Aerial photography: visual interpretation including the elements of interpretation, interpretation of the landforms, surface materials, and land use/cultural patterns; aerial camera formats, geometry, and flight planning.

b) The electromagnetic spectrum, the physical basis for remote sensing, the nature of Earth surface reflectance/emittance, spectral reflectance curves, overview of remote sensors and platforms.

c) Introduction to: 1. image processing to reduce noise and defects and to enhance imagery for visual interpretation and feature detection; 2. thematic classification for mapping of land cover types.

Recommended Texts on Reserve in Library in ARES

Despite it being 6 years old, the best overall text on remote sensing and image interpretation is: Lillesand, T., R. Kiefer, and J. Chipman. 2008. Remote sensing and image interpretation. 6th edition. John Wiley and Sons. Toronto. **Ordered for Bookstore and available online.** Note: this text is available in e-book version for 1/3 the price at the Wiley Website: <http://ca.wiley.com/WileyCDA/> In the Search window of the Wiley site, copy the ISBN #: 9780470052457. Then click on the book cover image and the e-book version will be available to buy at the bottom of the webpage.

Other good texts that present additional course detail for certain topics or a different perspective are:

Campbell, J.B. and R. H. Wynne. 2011. Introduction to Remote Sensing, 5th ed. Guilford Press.

Jensen, J. R. 2005. Introductory digital image processing: A remote sensing perspective, 3rd edition. Prentice-Hall.

Jensen, J.R. 2007. Remote Sensing of the Environment: An Earth Resource Perspective. 2nd edition. Prentice-Hall.

Read, R. and R. Graham. 2002. Manual of aerial survey: primary data acquisition. CRC Press/Whittles Publishing, Boca Raton, FL.

Bird, S.J.G. and I.M. Hale. 1993. Air Photo Interpretation of the Physical Environment. Bird and Hale Consultants, Toronto. **I have a copy of this and we will use photo examples from it.**

Websites with Remote Sensing Tutorials: e.g.,
<http://www.nrcan.gc.ca/earth-sciences/geography-boundary/remote-sensing/fundamentals/1430>
A PDF of the whole tutorial can also be downloaded at this site.

Evaluation

Lab reports	65%
Final examination	35%

Lab work

Labs are in A211 Loeb for the first part of term and in A237 Loeb for the second part. They consist of a combination of visual interpretation of hardcopy images, theoretical/descriptive questions, and computer analysis. They are one or two weeks in duration and will be handed back within 2 weeks. Each week of lab work is generally worth 5%.

Note: All labs are due within 1 hour of the beginning of your lab period on the due date. After that, 10% of the lab worth will be deducted per day, starting on the day it is due. i.e., If your lab is due at 9:30 AM on Friday, but the TA receives it Monday morning, you will lose 10% for the rest of Friday and 10% for the weekend, which counts as one day – i.e. 20%.

You may collaborate with others in working through the assignments, but you must prepare and submit your own separate lab report, written in your own words, which clearly demonstrates your understanding, interpretation and analysis. The goal is to learn the material on your own, so try to avoid depending on others for answers to questions in the assignments and try not to give blatant answers to others.

Exam

Combination of multiple choice, short answer, and long answer (synthesis) questions. No aids except calculator. The exam will be discussed, including sample exam questions and a summary of the course, at the end of the course.

Remember that plagiarism is an offence at Carleton University.

Plagiarism is a violation of the academic code of conduct:

<http://www4.carleton.ca/calendars//ugrad/current/regulations/acadregsuniv14.html>).

Plagiarism is a serious offence which cannot be resolved directly with the course instructor. A rigorous investigation is conducted by the Office of the Faculty Dean, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. If you think you might be violating the code and want to ensure you don't end up being sanctioned, contact myself or the TA.

The University Senate defines plagiarism as "presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own." This can include:

- reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another's data or research findings;
- failing to acknowledge sources through the use of proper citations when using another's works and/or failing to use quotation marks;
- handing in "substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs."

Academic Accommodation

You may need special arrangements to meet your academic obligations during the term because of disability, pregnancy or religious obligations.

Students with disabilities requiring academic accommodations in this course must register with the Paul Menton Centre for Students with Disabilities (PMC) for a formal evaluation of disability-related needs. Documented disabilities could include but are not limited to mobility/physical impairments, specific Learning Disabilities (LD), psychiatric/psychological disabilities, sensory disabilities, Attention Deficit Hyperactivity Disorder (ADHD), and chronic medical conditions. Registered PMC students are required to contact the PMC, 613-520-6608, every term to ensure that your Instructor receives your Letter of Accommodation, no later than two weeks before the first assignment is due or the first in-class test/midterm requiring accommodations. If you only require accommodations for your formally scheduled exam(s) in this course, please submit your request for accommodations to PMC by early November.

Pregnancy or Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website http://www.carleton.ca/equity/accommodation/student_guide.htm