FORS351 ENVIRONMENTAL REMOTE SENSING
SPRING 2016

Instructor:	LLoyd Queen, CHCB 428		
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Lab Instructor:	Valentijn Hoff, CHCB 437		
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Class Times:	Lecture	Fri	1010-1200 FOR301
	Lab	Fri	1210-1400 FOR301
Office Hours:	LLoyd	Fri	1300-1500
	Valentijn	TBD	
	Please note that we are readily available at other times, please call or email to set up an appointment.		
Reference Text:	Lillesand, Kiefer and Chipman. Remote Sensing and Image Interpretation. John Wiley and Sons, Inc. New York. (Any edition after ed. 5 is acceptable)		

Course Introduction:

Remote sensing is the science and art of collecting and interpreting information about the earth's surface through non-contact methods. Most natural resources remote sensing utilizes camera, electro-optical, or electronic scanning devices carried on aircraft or satellite platforms to collect data about earth surface features. Photogrammetry is the science of making measurements from these remotely sensed images and photographs.

FOR351 is designed to provide students with a working knowledge of the principles of obtaining information that describes natural resources and their condition from remotely sensed data. The student will gain familiarity with the acquisition, interpretation, and measurement of aerial photography and other remotely sensed imagery. An essential component of this sequence is the role of transferring data from aerial photos to a map base. Fundamentals of map use and orienteering will be covered. Lectures and reading assignments will be supplemented by lab exercises providing hands-on experience working with photography and imagery. Topics covered will include an introduction to remote sensing for natural resource inventory, land use analysis, and environmental monitoring. Photographic, multispectral, thermal, airborne and satellite techniques, and their application to resource assessment, are introduced. The course provides a survey of the history, theory, concepts, and techniques of remote sensing and image analysis. Applications of remote sensing will also be discussed during lecture periods. FOR351 is designed to cover the basic concepts, theory, and methods of analog remote sensing. Digital image processing is introduced in the last study unit, and is covered in detail in the companion course FOR551 Digital Image Analysis.

The content of this course covers four major study units:

1. Introduction to map use, orienteering, and geodata standards.
2. Concepts and foundations: The physical basis of remote sensing.
3. Air photo interpretation and photogrammetry.
4. Introduction to digital image processing, Geographic Information Systems (GIS), and Global Positioning Systems (GPS)

Students with disabilities may request reasonable modifications by contacting me. The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). "Reasonable" means the University permits no fundamental alterations of academic standards or retroactive modifications.

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at: The Student Conduct Code

Course Objectives:

The Society of American Foresters (SAF) has published a recommended skill set that forestry graduates are expected to have obtained. These technical skills, to be covered in this class, are:

- Exposure to maps, photos, and orthophotography
- Location of principal points, conjugate principal points, and flight lines
- Develop skills in the use of a stereoscope
- Determine scale
- Area determination
- Use of compass bearings and azimuths
- Determination of horizontal distance
- Cover type delineation
- Transfer of photo locations to a map base
- Understand advantages/disadvantages of film/filter/camera combinations
- A basic understanding of the electromagnetic spectrum
- Techniques for transfer of photo data into a GIS

Grading:

Grades will be determined based on student performance on individual assignments; two exams and the lab exercises and quizzes. A curving strategy is used to normalize student group performance; point totals from the assignments are added together, weighted, and graphed as a density function. Natural breaks and overall class GPA are then used to assign letter grades of A-F. Weights for individual assignments are:

Mid-term Exam	35%
Final Exam	35%
Labs	30%

Planned Lectures:

WEEK	TOPIC	READINGS
1	Course Overview	
2	Remote Sensing Principles	Chapter 1
3	Map Fundamentals and Parameters: Part I	WWW
4	Map Fundamentals and Parameters: Part II	WWW
5	The Physics of Remote Sensing	Chapter 1
6	Energy/Matter Interactions: Part I	Chapter 1
7	Energy/Matter Interactions: Part II	
8	Aerial Films, Filters and Devices	Chapter 2
9	Applied Photogrammetry and Photo Interpretation	Chapters 3 and 4
10	Mid Term Exam	
11	Spring Break (April 4 - 8)	
12	Multispectral Remote Sensing	Chapters 5 and 6
g13	Raster Image Classification and Accuracy Assessment	Chapter 7
14	Introduction to Global Positioning Systems	
15	Remote Sensing Applications Course Review and Evaluation	
16	Thursday May 12, 1010-121	**Final Exam**