

PHOTOGEOLOGY:
Geomorphologic Interpretation and Geologic Mapping
using air photos

COURSE INFORMATION

ROOM: NSF 233
TIME: Tues Lecture 5:20-6:20
Tuesday Lab 6:30-9:30

PROFESSOR

NAME: Dr. Jim Beget
OFFICE: NSF 334
PHONE: 474-5301
OFFICE HOURS: MON-WED. 9-11:30 or by appt.

TEACHING ASSISTANT

NAME: Joshua Payne
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OFFICE HOURS: to be announced at first class

TEXTBOOKS

REQUIRED: Interpretation of Air Photos and Remotely Sensed Imagery. Robert H. Arnold
Waveland Press (1997, revised 2004)

OPTIONAL: Photogeology and Photogeomorphology. N. H. Foster and E. A. Beaumont. AAPG Treatise Petroleum Geology No. 18, 555 p.

PREREQUISITES:

You will find it helpful if you have completed GEOS 304 Geomorphology and GEOS 314 Structural Geology before taking this class. It is possible to be successful in this class if you have not taken these courses, but it is highly recommended that you familiarize yourself with appropriate texts from these courses and use them as needed during the laboratory exercises. Some students find it helpful to buy an inexpensive geologic glossary or dictionary. A working knowledge of geometry and algebra are also important.

If you are color-blind, or unable to view objects stereoscopically, you will have difficulties with some of the laboratory exercises. In our first week's laboratory we will test ourselves for color blindness, and practice viewing objects in stereo (i.e. in three dimensions). If you have any problems with color blindness or ability to visualize in 3-D during the first laboratory session, please discuss this with me.

COURSE OBJECTIVES

1. You will gain experience in recognizing and interpreting geomorphic features and landforms on aerial photos.
2. This course will train you to recognize different lithologies and geologic structures on aerial photographs. You will learn about the influence of vegetation and weathering in different climatic zones on aerial photo mapping.
3. You will learn to make geologic maps from aerial photographs. The laboratory sections will cover the selection of units, the essential elements of all geologic maps. You will also learn about the mechanics of aerial photography and stereoscopy. There will be a brief introduction to methods for quantitative analyses of maps.
4. We will briefly survey the use of different types of satellite imagery for geomorphic studies and regional photogeologic mapping.
5. We will introduce the use of aerial photographs in field mapping.

COURSE DESCRIPTION

This course is divided into two parts. The first few weeks will be devoted to introductory lectures and exercises which will introduce you to aerial photos and geologic maps. We will cover the mechanics of aerial photography and stereoscopic viewing.

The laboratory will move to a series of exercises that involve mapping of progressively more complex structures and geomorphic features. Some laboratory exercises will involve completing mapping problems of various types and scales, and answering questions about geologic relations and history you interpret from your photo interpretations. The aerial photos will usually be from your text. In some cases you will map structural geology, while other exercises will emphasize interpretations of natural processes and geomorphology.

The second part of the class will concentrate on photogeologic mapping of complex areas and the use of photogeologic methods on special topics. We will do 1-2 lab exercises on difficult photo problems, including remotely sensed imagery. Students will then spend several weeks working on an independent mapping project using either their own photos, on a project provided by the instructor, or on a problem of their choice using photos available at the GEODATA CENTER in the GI. Students may work singly or in groups with groups required to map a larger area. Upon completion of the maps, students will make oral presentations describing the regional geology of the area they have mapped at the next to last class meeting. Short written reports will also be completed on the final mapping problems.

COURSE FORMAT

- LECTURE:** Each class session will begin with a lecture covering technical aspects of photogeologic mapping.
- LABORATORY:** Labs will deal with progressively more difficult photogeologic mapping problems.
- READINGS:** Readings from the text will be assigned weekly, and will contain information relating to the lecture and the lab work. Some additional, supplemental readings may also be assigned.
- EXAMINATIONS:** Only one examination will be held, in the middle of the term. The exam will be based on lectures and lab exercises, and will include photo interpretation of a series of images.
- GRADES:** The examination will be worth 33% of the grade. The final project (map & report) will be worth an additional 33% and lab exercises during the term will make up the final 33%.
- DUE DATES:** In general, it will be possible to complete work during the weekly labs. However, if a mapping exercise takes you a bit longer, or if you have a conflict with the lab, exercises will be accepted up to the end of the next class. No weekly labs will be accepted after this deadline.
- FINAL PROJECT:** **All final project topics must be cleared in advance with me.**

The final project is an important part of this class. You are responsible for picking an interesting area and problem to map. There is complete photo coverage of Alaska in the GI, so you can work on just about any Alaskan problem you want. Its a good idea to start thinking and planning your project before the end of the term.

In past classes people have selected areas that they mapped or visited during geologic work the previous summer. Some students map a family cabin or a mineral claim. Some students work on extraterrestrial imagery, or photos or archeologic sites, or homesteads. Any problem in any area where you can find photos is ok.

You can work alone, but groups of 2-3 are also acceptable.

Groups must map proportionally larger areas. I will happily suggest some possible final projects to you if you need an idea. Each project should have a theme...(i.e. glacial geology, or active fault scarps, or jointing patterns, etc.) but all geology in the photos you select must be mapped.

FOOD:*

It can be nice to have an evening class... However there is a small problem with missing dinner.* If you want to eat during the lecture portion of the class it is ok with me. Please feel free to bring food to class, and to eat it during the first hour of the class. I'd don't want food around the lab materials, so if you want to eat during the last 3 hours of the class, please leave classroom during the lab period and go upstairs and use the microwave and have a bite there.

*I'll bet this is the first syllabus you've ever seen with a section on food.

Speaking of food.....

WARNING:

PHOTOGEOLOGY CAN MAKE YOU SICK---see next page!!!



Every year some students become nauseous during the lab portion of this class. This occurs because of eyestrain.

This illustration shows typical GEOS 408 mapping group trying to decide what they should do on their final project. Note how cross-eyed everyone has become from looking down stereoscopes too long!!!!!!

Its true....you can make yourself a little bit sick in the lab from crossing and uncrossing your eyes to look down the scopes, particularly if the original flight lines weren't parallel or the photo pairs aren't aligned properly. If you begin to feel nauseous, just stop working, get up, walk around and get some fresh air. Don't let yourself get even close to feeling like the people in the above illustration look...take a break, drink a coke, go for a walk outside.

**Please note that the nausea warning refers to the labs only....there is no escape if my lectures make you sick.*

DATE (WEEK OF)	LAB/LECTURE
1-16	Introduction/aerial photos/stereoscopes & stereovision
1-23	Begining photo analysis/drainage patterns
1-30	Geologic maps /volcanic landforms
2-6	Tectonism/active faulting/folds
2-13	Simple structure
2-20	Glacial Geology/Surfical geologic mapping
2-27	Fluvial/Desert/ Periglacial surficial features
3-6	Mapping complex structure (practice project)
=====spring break=====	
3-20	Midterm examination
3-27	Remote sensing/Landsat/Radar
4-3	MEET AT GI PHOTO ARCHIVES--begin work on projects
4-10	work on final projects
4-17	FINAL PROJECTS DUE Part ONE----in class reports given
4-24.1	FINAL PROJECTS DUE Part TWO----in class reports given
5-1	Mapping with aerial photos (field trip...wear mud boots)

This schedule is preliminary and may be modified.