



# Geographic Information Systems for Geology and Planetary Sciences GE 110 Fall 2007



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## Meeting Schedule

**Organizational Meeting:** Monday October 1, 2007

**Time:** 1:00pm-1:30pm

**Location:** 215 NM

**Lecture:** TBA

**Lab:** TBA

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## Contact Information

**Professor:** Jean-Philippe Avouac

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**Office Hours:** TBA

**GIS Trainer:** JoAnne Giberson

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**GIS Lab Hours:** Th 2:00pm-5:00pm.

**TA:** William Amidon

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**Office Hours:** TBA

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## Overview

**Ge 110.** Geographic Information System for Geology and Planetary Sciences. 3 units (0-3-0)

**Summary:** This course is an introduction to the application of Geographic Information Systems (GIS) in Earth and planetary sciences. GIS is a computer-based system used for mapping and geospatial analysis. The goal of the course is to provide a solid foundation in the principles of GIS concentrating on how it is used as a research tool in Earth and planetary sciences.

**Organization:** The class will meet on Tuesdays from 4:00-5:00 pm and Thursdays from 12:00-2:00 pm. The classes will cover the GIS principles and the labs will take the form of practical lab exercises mainly using ArcGIS software developed by ESRI. There will also be a brief introduction to ERDAS, ENVI and Google Earth. The labs will incorporate a variety of data sets for Earth and Mars including Digital Elevation Models, geodetic measurements, satellite images, and geological maps. There will be a final GIS project of your choice due on December 3 (the last day of class for GE 110).

**Text:** *GIS Fundamentals: A First Text on Geographic Information Systems, 2nd Ed.* (Paul Bolstad)

### **Grading:**

50% Labs (labs will be due at the beginning of class the following Tuesday) 1 lab of your choice optional  
50% Final GIS project (informal presentation the last week of class)

**Class Schedule: The following schedule is tentative and subject to revision.**

<b>Week</b>	<b>Tuesdays 4-5p.m.</b>	<b>Thursdays 12-2:00p.m. GIS Lab Reserved 12-3p.m</b>	<b>Reading</b>
Oct 1-5      OM			
Oct 8-12 (4 Hours)	Introduction to GIS Overview of Data Models	Lecture: -Data Formats -GIS Project Management	1-An Introduction (14-21) 2-Data Models ((25-44, 46-47)
Oct 15-19 (3 Hours)	Lab 1 (1/2 lab): -Building GIS Project using existing Data -Terrain Analysis Hillshade Contours -Simple Map Layout	Lab 2: -Terrain Analysis Slope Line of Sight Viewshed Profiles -ArcScene (3D Analyst) -Creating & Editing Data -Map Layout with Legend	11-Terrain Analysis 7-Digital Data
Oct 22-26 (3 Hours)	GPS Lab 3 (1/2 lab): -Field Data Collection -Adding XY Events Exporting to Shapefile -Creating & Editing Data Continued	Lab 4: Map Projections & Coordinate Systems Lab 4: -Map Scale -Map Projections -Datum Transformations -Map Layout Multiple Data Frames	3-Map Projections & Coordinate Systems (67-94,97-104) 5-The Global Positioning System
Oct 29- Nov 2 (3 Hours)	Data Sources Data Standards Remote Sensing	Lab 5: -Introduction to ERDAS & ENVI -Image Processing -DEM Processing -ASTER DTM	4-Data Sources and Data Entry (111-135) 14-Data Standards & Data Quality 6-Aerial and Satellite Images
Nov 5-9 (3 Hours)	Spatial Analysis Raster Analysis Lab 6 (1/2 lab): -Spatial Analysis	<b>GIS Lab Reserved 12-2p.m.</b> Lab 7: -Image Rectification -Spatial Analysis Continued	4-Data Sources and Data Entry (139-150) 9-Basic Spatial Analysis (295- 335) 10-Topics in Raster Analysis (347-370)
Nov 12-16 (2 Hours)	No Class - Open Lab Time TO Meeting	Lab 8: -Topology -Geodatabase	

Week	Lecture	Lab	Reading
Nov 19-21 Thanksgiving No Lab (1)	Lab 9 (1/2 lab): -Scripts & Extensions (ArcGIS)	Happy  Thanksgiving!	12-Spatial Estimation 13-Spatial Modeling
Nov 26-Nov 30 (3)	Introduction to Google Earth	Lab 10: -Velocity Vectors -ArcScene Focal Mechanisms	
Dec 3-7 (1)	Last day of class  <b>Final Projects due</b> Should include: Rasters -DEM -Images Processed -Images Rectified Vectors -Existing Data w/Spatial Analysis -Created Data with Attributes -Use of new Script or Extension		