

Course Syllabus
GEOL 410/510, Winter 2007

Course Title: Satellite Interferometry
CRN: 25773/25774
Meeting Time: T 9-10 (101 Volcanology)
Th 9-12 (101 Cascade)

Instructor: Prof. David Schmidt
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OH: Tu 10-11 or by appt.

Course Description: Satellite Interferometry is a technique recently adopted by the earth science community to study various active earth processes. This technique has rapidly grown in popularity over the past decade because it provides a unique dataset to study seismic, volcanic, hydrologic, and other surface processes. The material covered in this class constitutes a ‘crash course’ on the theoretical concepts and practical computing skills necessary to apply satellite interferometry towards the study of the earth. In addition to the focused topic of satellite Interferometry, students will be exposed to topics of active research, and gain a variety of practical computer skills.

Course Format: Class meetings will consist of a combination of lecture and computer laboratory. Much of the class time on Thursdays will be actively spent on computers.

Required Reading: There is no textbook for this course. Instead, we will be reading excerpts from various books and review papers. A course packet is available in the bookstore. Additional readings will be handed out in class or posted online (Blackboard).

Homework: Problem sets will be assigned periodically throughout the quarter. Some questions will focus on computer skills; others will explore topics discussed in lecture. Homework will be due 1 week after it is assigned.

Web Tutorials: Students will learn how to process satellite data using the software package ROI_PAC. Minimal documentation is currently available in the public domain that describes how to run this software package. The existing documentation is found online in the form of web tutorials. As part of the course assignments, each student will expand on the current web tutorials by creating one web page that describes undocumented functions or capabilities of the software package. Students who are learning the software package for the first time have the greatest insight into where the current documentation is lacking. We will discuss how the documentation can be improved as a group and assign specific tasks to members of the class. The final web products will be integrated into the existing documentation for public use. Tutorial pages must be completed prior to the end of finals week.

Course Project: The major component of the course will be an independent project. Students will identify a geologic process to investigate, choose a region of study, and process the available satellite data for that region. Results will be summarized in both oral and written form. Each student will give a 15 minute presentation during the last week of classes. Written reports will be published online as a web page and must be posted by Friday of finals week. More details on the project will be provided later in the term.

Final Grade Assignments:

Homework	10%
Midterm	30%
Online Tutorial Page	10%
Project Proposal	5%
Project Presentation	15%
Online Project Report	30%

Final grades will be based on a curve. However, given the small size of the class, students who score >90% will be guaranteed at least an A-, students who score >80% will be guaranteed at least a B-, and students who score >70% will be guaranteed at least a C-.

Tentative Course Schedule:

	Tuesday (Lecture)	Thursday (Computer Lab)
Week 1	Course Introduction	Intro to Mac Terminal <i>Read: Enzer (2003). Ch 1, pp 1-20</i>
Week 2	Electromagnetic waves, adsorption, scattering <i>Read: Pritchard (2006)</i>	Unix Commands <i>Read: Enzer (2003). Ch 2, pp 1-57</i>
Week 3	Satellite radar systems <i>Read: Hanssen (2001) 2.1-2.2</i>	Online SAR Catalogues <i>Read: Hanssen (2001) 2.5.1</i>
Week 4	Differential Interferometry <i>Read: Hanssen (2001) 2.3-2.4</i>	ROI_PAC Software <i>Read: Hanssen (2001) 2.5.2-2.5.13</i>
Week 5	Uncertainties and error sources <i>Read: Bürgmann et al. (2000)</i>	Project Proposal Due Interpretation of Interferograms
Week 6	Case Study: Mass wasting <i>Read: Catani et al. (2005), Hilley et al. (2004)</i>	Midterm SRTM/DEM
Week 7	Case Study: Earthquakes and faulting <i>Read: Fialko et al. (2001)</i>	Web Tutorials
Week 8	Case Study: Land subsidence <i>Read: Amelung et al. (1999)</i>	Web Publishing: Report Prep Project Updates
Week 9	Case Study: Ice flows <i>Read: Rignot et al. (2004)</i>	Work Day
Week 10	Case Study: Volcanic deformation <i>Read: Wicks et al. (2002)</i>	Presentations
Finals Week	Online Reports and Tutorials Due Friday 10 am	