

January 2008 - Outline, Syllabus

Meteo 597E: Remote Sensing of the Earth System Outline Meeting 1325-1555 Wednesdays in Dieke Room 4

Instructors: Dr. Anne M. Thompson, amt16@psu.edu

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Office Hours: Wed., Thurs, 11-noon. or by appointment

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Office Hours: Mon, Tues, Thurs, 1-2 pm

With Topical Professors-

Clouds & Radiation: Dr. Eugene E Clothiaux, **Meteo**, cloth@meteo.psu.edu

Surface Remote Sensing: Dr. Matt Fantle, **Geosci**, mfantle@geosc.psu.edu

Ocean Color and Processes: Dr. Ray Najjar, **Meteo**, najjar@meteo.psu.edu

Cryosphere - Snow, Sea-ice, Glaciers: Dr. Derrick Lampkin, **Geography**,
djl22@psu.edu

Geodesy and Tectonics: Dr. Peter LaFemina, **Geosciences**,
pfemina@geosc.psu.edu

COURSE SUMMARY:

This interactive, interdisciplinary course is designed to familiarize students working at the interfaces of disciplines within the Earth Sciences with applications of remote sensing. The emphasis is on reading, researching and discussing recent literature, highlighting hot topics that use satellite data from current platforms. It will complement discipline-oriented classes and sensor or algorithm physics. The syllabus is arranged to cover air-water-land-solid aspects of the Earth System. The Instructors, from across several Colleges, will give overview lectures, with topical presentations by specialists using remote-sensing data in their research. Students will read recent papers and lead discussions. They will carry out a hands-on research project, reporting on it in class and giving a Poster Presentation, in lieu of a Final.

CLASS FORMAT & OVERVIEW TEXT: One seminar style class/week (2.5 hr). An overview of topics is presented in a new book by King, Parkinson, Partington and Williams: "Our Changing Planet". ISBN = 13: 9780521828703. The book may be purchased on-line for ~ 35-50\$.

ANGEL will be used to post all readings and Lectures. Candidate readings for Student presentations will be in Topical Folders.

CLASS OBJECTIVES & ASSIGNMENTS:

- (1) Become familiar with the evolution and present-day techniques for remote sensing of the atmosphere, hydrosphere, cryosphere, geosphere. Gain an understanding of methods, accuracy and uncertainties in satellite data. Demonstration of selected techniques used in PSU research labs will be included.
- (2) Learn how new satellite observations and data are applied to problems in global change, eg monitoring ozone, climate-related processes in land surface, clouds & radiation, oceans & ice, tectonics. Become familiar with major online datasets and related models.
- (3) You will choose topics among suggested papers. About half the class presentations will be by Faculty with students presenting the other other half. You will learn to organize material for presentation and lead discussion. Give the material with background, showing critical thinking, posing questions to engage the class.
- (4) In the final Project, learn how to work with data, organize it to answer an important scientific problem. Report and write up results in Poster Format with Objective/ Experimental/Method/Procedure, Results, Discussion, Conclusion, referencing appropriately.
- (5) At the end of the course, students should be able to start a Graduate or Honors project or an undergraduate Independent Study based on remote sensing observations.

COURSE CREDIT:

Grade is based on quality and creativity shown in preparation, class participation, presentations and the Final Project (40-50% of grade).

PREREQUISITES & CREDIT/CERTIFICATION: Class is open to all. Graduate students, Seniors and other qualified undergraduates are welcome! There are no prerequisites although Remote Sensing (Meteo 433) may be helpful. Note to Meteo undergraduates: Class will count as a Remote Sensing element for the National Weather Service or AMS 'credit.'

ACADEMIC INTEGRITY AND STANDARDS:

We remind you of the University Policy on Academic Integrity:
<http://www.ems.psu.edu/students/integrity/form.pdf>

OTHER NOTES:

Let Instructor or TA know in advance of religious observances, any required disability accommodation.

WEEK #	Day	Meteo/EE 597A	Unit/Topic
1	16 Jan		Introduction to Class: Meet and Greet Status of Earth System Remote Sensing (Gail Article) Overview Talk: 50 Years of Earth Observations, from 2007 NAS/NRC Report Assignment will be Given: Prepare Topical Timeline of Satellites in Atmosphere, Hydrosphere, Cryosphere, Land Surface
2	23 Jan	AMT	Atmosphere I - Composition, the "Good & Bad Ozone"
3	30 Jan	TBD EEC	Student Presentation on Composition Atmosphere II - Clouds and Radiation
4	6 Feb	TBD	Student Presentation on Clouds, Radiation and/or Aerosols TBD-Instructor - Atmosphere III - Upper Atmosphere or Hydrosphere I
5	13 Feb	TBD	Student Presentations on Timelines (30-45 mins each)
6	20 Feb	RN	Hydrosphere II: Ocean Remote Sensing
7	27 Feb	TBD TJK	Student Presentation on Ocean or Hydro Topic Lab Tour - Lidar Remote Sensing
8	5 March	DJL	Cryosphere: Snow Cover, Sea-Ice, Glaciers
		Spring Break	12 March
9	19 March	TBD TJK	Student Presentation on Hydro or Cryo Topic Special Lecture on Retrievals
10	26 March	PL AMT/TJK	Geosphere: GPS, Tectonics Intro to Final Projects
11	2 April	TBD MF	Student Presentation Land/soils Remote Sensing one student presentation
12	9 April	TBD AMT	Student Presentation - Land LabTour
13	16 April		Guest Lecture - Prof Elmore, Frostburg Univ, Maryland
14, 15 "Final"	23, 30 April Time TBD		All Students – Project Presentations, 30-45 mins each POSTER PRESENTATION