EE G6903: Remote Sensing – Spring

Class Hours: Wednesdays 2:00 – 4:45

William B. Rossow, Distinguished Professor of Electrical Engineering
Steinman 512, wbrossow@ccny.cuny.edu
Office Hours: Wednesdays 12:00 – 2:00

Website for materials: crest.ccny.cuny.edu/rscg/courses/eeg6903/eeg6903.html
Reading Assignment Page:
http://crest.ccny.cuny.edu/rscg/Research/Assignments/Assignments.html

Lectures will review the relevant physics of radiation, develop radiative transfer theory, illustrate applications of radiative transfer to remote sensing measurements of Earth’s atmosphere and land-ocean surfaces, and describe practical methods for advanced analysis of satellite remote sensing data.

Learning Goals: To understand the conceptual and physical foundations of remote sensing, especially satellite remote sensing of Earth, and to become acquainted with methods for analysis of remote sensing data.

Academic Integrity:
http://www/cuny.edu/about/administration/offices/Ia/Academic_Integrity_Policy.pdf

Grades: Based on combination of Attendance, Participation in Class Discussions and Final Oral Presentation

Student Presentation should be based on reading at least 2 technical papers about one of the following types of instruments:

(1) Spectrometers
(2) Polarimeters
(3) Lidars
(4) Radars.

Presentation should describe the remote sensing principle of the instrument and give at least two examples of practical applications to observing Earth.

CLASS SCHEDULE

CLASS #1: CLASS ORGANIZATION
LECTURE #1: Review of Radiation Physics, Maxwell’s Equations, 1D to 3D Radiation
READING ASSIGNMENT = Stephens Chapter 2 & Chandrasehkar Excerpt

CLASS #2:
LECTURE #2: Radiative Transfer Equation and Solutions, Radiative Transfer Models
READING ASSIGNMENT = Stephens Chapters 1.2 & 3.1-3.4 & 6.2 & 7.2-7.3

CLASS #3:
LECTURE #3: Radiation Types from Earth, Remote Sensing Instrument Characteristics, Satellite Orbits and Sampling Characteristics

CLASS #4:
LECTURE #4: Remote Sensing, Information Theory, Inverse Problem, Practical Retrieval Approaches (Scene ID)
READING ASSIGNMENT = Stephens Chapters 3.6 & 4.4-4.5 & 7.5

CLASS #5:
LECTURE #5: Emitted Radiation – Infrared & Microwave Imagers, Sounders and Spectrometers
READING ASSIGNMENT = Chapter 14 in Mishchenko, Stephens Chapter 8

CLASS #6:
LECTURE #6: Scattered Radiation by Molecules, Aerosols, Cloud Particles, Precipitation Particles, Particle Size Effects on Absorption and Scattering, Polarimeters
READING ASSIGNMENT = Stephens Chapter 5

CLASS #7:
LECTURE #7: Active Sensors: Lidars and Radars
READING ASSIGNMENT = Stephens Chapters 7, Rossow et al 1985 & 1993

CLASS #8: SELECT STUDENT PRESENTATION TOPICS
LECTURE #8: Scene Identification: The Really Tricky Part

CLASS #9:
LECTURE #9: Combined Analysis Approaches: Why Do It This Way? (Neural Networks)

CLASS #10: STUDENT PRESENTATIONS

CLASS #11: STUDENT PRESENTATIONS

CLASS #12: 
LECTURE #10: Evaluating The Results: Statistical & Physical Approaches
READING


Books


