
Fall 2022 - Class meets 2:00 PM to 3:20 PM

Class website: Canvas

Dr. Mark Miller, Room 233, ENR, m.miller@envsci.rutgers.edu
Dr. John Wilkin, Room 214C, DMCS, jwilkin@rutgers.edu, ph: 609-630-0559
Dr. Jim Miller, Room 111D, DMCS, miller@marine.rutgers.edu

Learning Goals for This Course

- Develop a basic understanding of the types and applications of remote sensor technology used in Atmospheric and Oceanic Science.
- Develop specific understanding of the radar and satellite remote sensors used to conduct a weather discussion of mesoscale and synoptic weather systems, and ocean state.
- Develop specific understanding of the physical principles used to remotely sense atmospheric and oceanic structure.
- Exhibit critical thinking when confronting new information.
- Communicate clearly orally and in writing, including by electronic means.

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<td><strong>Orbits and Scan Geometry 1</strong></td>
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<td><strong>Infrared Sea Surface Temperature and Ocean Color</strong></td>
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<td><strong>Ocean Surface Salinity</strong></td>
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5 9/22  T  Electromagnetic Radiation 1  J. Miller


Electromagnetic Radiation II

Fundamentals of Remote Sensing

Plank's Blackbody Equation (Shortwave and longwave limits, Wien's Law, Stefan-Boltzmann Law)

Radiative transfer equation (RTE, Absorption only, Beer's Law)

7 9/27  T  Vertical Soundings I/Temperature Profiles  J. Miller

Chahine paper (handout in class)

8 9/29  T  Vertical Soundings II (ozone, water vapor, gases)  J. Miller

Earth Radiation Budget (slides)

NASA: Climate and Earth Energy Budget

ERBE(sensors/cloud radiative forcing)

10 10/4  T  Climate and climate change applications  J. Miller

10 10/6  Th  Satellite Applications: Synoptic Meteorology Satellite Applications for Weather  M. Miller

https://rutgers.instructure.com/courses/193629
12  10/13  Th  Weather Radar I: Radar Equation and Basics  Radar Basics  M. Miller
13  10/18  T  Weather Radar II: Scattering / Propagation  Radar Basics  M. Miller
14  10/20  Th  EXAM 1
15  10/25  T  Ocean Vector Winds  J. Wilkin
16  10/27  Th  HF-radar for ocean current (CODAR)  J. Wilkin
17  11/1  T  Altimetry I  J. Wilkin
18  11/3  Th  Altimetry II  J. Wilkin
20  11/10  Th  Weather Radar IV: WSR-88D and Doppler  Radar Basics  M. Miller
22  11/17  Th  Finish Weather Radar / Climate Radars / Lidars  Radar Basics  M. Miller
23  11/22  T  EXAM 2
24  11/29  T  Orbiting Carbon Observatory and Biosensors  M. Miller

Remote Sensing of the Cryosphere (take home assessment)

25  12/1  Th  Cryosphere (Sea ice)  M. Miller
26  12/6  T  STUDENT PROJECT PRESENTATIONS
Grading:

Weighting: Homework (35%), Exams (40%), Term Project (25%)