

# 2022FA - REM SENS OCN ATMOS (11:670:451 & 16:712:552)

## Remote Sensing of the Atmosphere and Ocean (11:670:451/16:712:552)

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

Class website: **Canvas**

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### 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.

Class #	Date	Day	Topic	Lecturer
1	9/6	T	Course Introduction	All
			<a href="#">Orbits and Scan Geometry 1</a>	J. Wilkin
2	9/8	Th	<a href="#">Orbits and Scan Geometry 2</a>	J. Wilkin
3	9/13	T	<a href="#">Infrared Sea Surface Temperature and Ocean Color</a>	J. Wilkin
4	9/15	Th	<a href="#">Ocean Surface Salinity</a>	J. Wilkin

5	9/22	T	<a href="#">Electromagnetic Radiation 1</a>	J. Miller
6	9/24	Th	<a href="https://www.nrcan.gc.ca/maps-tools-and-publications/satellite-imagery-and-air-photos/tutorial-fundamentals-remote-sensing/9309">Remote Sensing Tutorials (https://www.nrcan.gc.ca/maps-tools-and-publications/satellite-imagery-and-air-photos/tutorial-fundamentals-remote-sensing/9309)</a>	J. Miller
			Electromagnetic Radiation II	
			<a href="#">Fundamentals of Remote Sensing</a>	
			<a href="#">Plank's Blackbody Equation (Shortwave and longwave limits, Wien's Law, Stefan-Boltzmann Law)</a>	
			<a href="#">Radiative transfer equation (RTE, Absorption only, Beer's Law)</a>	
7	9/27	T	<a href="#">Vertical Soundings I/Temperature Profiles</a> <a href="#">Chahine paper (handout in class)</a>	J. Miller
8	9/29	T	Vertical Soundings II (ozone, water vapor, gases)	J. Miller
			<a href="#">Earth Radiation Budget (slides)</a>	
9	10/4	T	NASA: Climate and Earth Energy Budget ERBE(sensors/cloud radiative forcing)	J. Miller
10	10/6	Th	Climate and climate change applications	J. Miller
11	10/11	T	Satellite Applications: Synoptic Meteorology <a href="#">Satellite Applications for Weather</a>	M. Miller

12	10/13	Th	Weather Radar I: Radar Equation and Basics <a href="#">Radar Basics</a>	M. Miller
13	10/18	T	Weather Radar II: Scattering / Propagation <a href="#">Radar Basics</a>	M. Miller
14	10/20	Th	<b>EXAM 1</b>	
15	10/25	T	<a href="#">Ocean Vector Winds</a>	J. Wilkin
16	10/27	Th	<a href="#">HF-radar for ocean current (CODAR)</a>	J. Wilkin
17	11/1	T	<a href="#">Altimetry I</a>	J. Wilkin
18	11/3	Th	<a href="#">Altimetry II</a>	J. Wilkin
19	11/8	T	Weather Radar III: Brightband and Propagation <a href="#">Radar Basics</a>	M. Miller
20	11/10	Th	Weather Radar IV: WSR-88D and Doppler <a href="#">Radar Basics</a>	M. Miller
21	11/15	T	Weather Radar V: Polarization and Wind Profilers / RASS <a href="#">Radar Basics</a>	M. Miller
22	11/17	Th	Finish Weather Radar / Climate Radars / Lidars <a href="#">Radar Basics</a>	M. Miller
23	11/22	T	<b>EXAM 2</b>	
24	11/29	T	Orbiting Carbon Observatory and Biosensors	M. Miller
			Remote Sensing of the Cryosphere (take home assessment)	
25	12/1	Th	<a href="#">Cryosphere (Sea ice)</a> ↓ ( <a href="https://rutgers.instructure.com/courses/71844/files/13293493/download?download_frd=1">https://rutgers.instructure.com/courses/71844/files/13293493/download?download_frd=1</a> ) J. Miller	M. Miller
26	12/6	T	STUDENT PROJECT PRESENTATIONS	

27 12/8 Th STUDENT PROJECT PRESENTATIONS

28 12/13 T STUDENT PROJECT PRESENTATIONS

Grading:

[Weighting: Homework \(35%\), Exams \(40%\), Term Project \(25%\)](#)