Course Syllabus

PHYSICAL METEOROLOGY 11:670:431

Dr. Miller ENR 233

1	1/18	Tues		**Cloud Microphysics**	Nucleation of Water Vapor
2	1/21	Fri		**Chapter 6**	
3	1/25	Tues			Microphysics of Liquid Clouds
4	1/28	Fri			Cloud Liquid Water
5	2/1	Tues			Growth of Cloud Droplets
6	2/4	Fri			Entrainment
7	2/8	Tues	**Quiz**		Precipitation in Liquid Clouds
8	2/11	Fri			Microphysics of Mixed-Phase and Ice Clouds
9	2/15	Tues			Precipitation in Mixed-Phase Clouds: Wegener–Bergeron–Finde
10	2/18	Fri			Artificial Modification of Clouds
11	2/22	Tues			Cloud Electrification
12	2/25	Fri		**Atmospheric Radiation**	Description of Radiation
13	3/1	Tues	**Exam #1**	**Chapter 4**	
14	3/4	Fri			Blackbody Radiation / Planck's Law
15	3/8	Tues			
16	3/11	Fri			Scattering, Absorption
	SPRING BREAK				
17	3/22	Tues			Visibility
18	3/25	Fri			
19	3/29	Tues			IR Emission and Schwarzchild's Equation
	4/1	Fri			Heating Rates and Global Radiation Balance
21	4/5	Tues	**Exam #2**		
22	4/8	Fri		**Atmospheric Boundary Layer**	Optics/ Intro to Turbulence
23	4/12	Tues		**Chapter 9**	Turbulent Transport and Fluxes
24	4/15	Fri			Turbulence Closure
25	4/19	Tues			Zeroth Order Closure: Similarity Theory
26	4/22	Fri	Quiz		The Surface Energy Budget
27	4/26	Tues			Vertical Structure of Boundary Layer
28	4/29	Fri			Evolution of Boundary Layer

Final	**5/5**	**Thursday 12-3 pm**	**Comprehensive**	**ENR 233**

2 Quizzes	10%	Policies
Homeworks	30%	**Late Homework Penalty: 25% per day and 100% after day 2**
2 Midterm Examinations	40%	**Late Quiz Penalty: no make-up quizzes**
Final Examination	20%	Office Hours: Zoom or Office BY APPOINTMENT

Text: Wallace and Hobbs: Atmospheric Science: An Introductory Survey

Learning Goals:

(1) Exhibit critical thinking when confronting new information

(2) Apply the mathematical and physical foundations of Meteorology and Climatology to solve problems using analytical and computational methods

(3) Exhibit a working knowledge of cloud droplet and ice crystal formation

(4) Understand the physics leading to the formation of precipitation

(5) Exhibit a working knowledge of the transfer of shortwave and longwave radiation in the atmosphere

(6) Be able to explain the basic physics of light scattering by small particles

(7) Demonstrate the ability to explain the reasons for the spectrum of colors observed in the sky

(8) Be able to identify observable optical phenomena and explain the underlying physics

(9) Exhibit a basic understanding of boundary layer structure and turbulence

Course Summary:

Date	Details	Due
Fri Feb 4, 2022	Homework 1: Kohler Curves and the Dynamics of Supersaturation (https://rutgers.instructure.com/courses/165633/assignments/1904996)	due by 12:10pm
Fri Feb 11, 2022	Quiz #1 In-Class (https://rutgers.instructure.com/courses/165633/assignments/1917775)	due by 12:10pm
Tue Feb 15, 2022	Homework 2: Cloud Droplets, Rainfall, and Latent Heat (https://rutgers.instructure.com/courses/165633/assignments/1912540)	due by 12:10pm
Mon Feb 21, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736127&include_contexts=course_165633)	8:30pm to 9:30pm
Sun Feb 27, 2022	Lightning-Thunder Distance Table (https://rutgers.instructure.com/courses/165633/assignments/1930526)	due by 11:59pm
Mon Feb 28, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736128&include_contexts=course_165633)	8:30pm to 9:30pm
Mar 3, 2022	Exam #1 (https://rutgers.instructure.com/courses/165633/assignments/1945882)	due by 1:30pm
Mon Mar 7, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736129&include_contexts=course_165633)	8:30pm to 9:30pm
Sat Mar 12, 2022	HW #3 (https://rutgers.instructure.com/courses/165633/assignments/1937987)	due by 12:59pm
Mon Mar 14, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736130&include_contexts=course_165633)	8:30pm to 9:30pm
Mon Mar 21, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736131&include_contexts=course_165633)	8:30pm to 9:30pm
Mon Mar 28, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736132&include_contexts=course_165633)	8:30pm to 9:30pm
Tue Mar 29, 2022	HW #4 (https://rutgers.instructure.com/courses/165633/assignments/1945875)	due by 11:59pm
Mon Apr 4, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736133&include_contexts=course_165633)	8:30pm to 9:30pm
Mon Apr 11, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736134&include_contexts=course_165633)	8:30pm to 9:30pm

Date	Details	Due
Fri Apr 15, 2022	HW #5 (https://rutgers.instructure.com/courses/165633/assignments/1964975)	due by 11:59pm
Sat Apr 16, 2022	HW #5 (https://rutgers.instructure.com/courses/165633/assignments/1964975) (1 student)	due by 5pm
Sun Apr 17, 2022	Exam #2 (https://rutgers.instructure.com/courses/165633/assignments/1969872)	due by 11:59pm
Mon Apr 18, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736135&include_contexts=course_165633)	8:30pm to 9:30pm
Fri Apr 22, 2022	Quiz #2 In class (https://rutgers.instructure.com/courses/165633/assignments/1988593)	due by 11:59pm
Mon Apr 25, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736136&include_contexts=course_165633)	8:30pm to 9:30pm
Sun May 1, 2022	HW #6 (https://rutgers.instructure.com/courses/165633/assignments/1974206)	due by 5pm
Mon May 2, 2022	PHYSICAL METEOROLOGY ONLINE OFFICE HOURS (https://rutgers.instructure.com/calendar?event_id=736137&include_contexts=course_165633)	8:30pm to 9:30pm
Wed May 4, 2022	2022SP - PHYSICAL METEOROLOGY 11:670:431:01 (https://rutgers.instructure.com/calendar?event_id=767548&include_contexts=course_165633)	2pm to 4pm
Thu May 5, 2022	Final Exam Photo and Description Upload (https://rutgers.instructure.com/courses/165633/assignments/1983995)	due by 3pm
Fri May 6, 2022	Final Exam (https://rutgers.instructure.com/courses/165633/assignments/1989455)	due by 11:30am
	HW #5 (https://rutgers.instructure.com/courses/165633/assignments/1964975) (1 student)	