

**SYLLABUS**  
**ATM/EST 102 WEATHER AND CLIMATE**  
**Spring 2020 530-650pm T-Th Javits 102**

PROF. JOHN E. MAK, instructor ([john.mak@stonybrook.edu](mailto:john.mak@stonybrook.edu))

Office hours TUESDAY/THURSDAY 1-3, by appointment (x28673) (115A Dana Hall)

Welcome! The goal of this class is to give you a working knowledge of: what drives weather and weather related phenomena; what drives climate, on both regional and global scales, and how climates have changed over time and how they may change in the future. With all the recent happenings regarding the state of Earth's climate and what to do about it, we will be devoting a significant amount of time to the current climate predictions from the US Global Change Research Program (GCRP) as well as delve into oft-mentioned but rarely discussed political leaders' proposals to deal with future climate.

We are using seven chapters from the online textbook ([Meteorology: An Interactive Understanding of the Atmosphere](#), Atkinson and Knox). Embedded into this ebook are interactive questions and assignments within each chapter. Readings will be assigned and you will be able to answer all questions for each homework assignment within a specified, and announced, period (all assignment due dates will be posted on Blackboard). This ebook costs \$55. To access the ebook, go to:

<https://app.tophat.com/e/207816>

Join Code: 207816

Choose the 'one semester' option for the \$55 price.

The other material we will use is free, accessible by internet.

There will be two in-class exams and a final.

Course evaluation is weighted like this:

Homework assignments		40%
2 in-class exams	(DATES TBA)	40%
Final Exam	(PER REGISTRAR SCHEDULE)	20%

My lectures will follow the sequence of topics covered in the ebook. My examples, however, will oftentimes be different than those used in the text, as I will be discussing real-time events. Exams will cover material covered in class and presented in the ebook and you are responsible for knowing both sets. In other words, come to class.

While this course is not technically an online course, all lectures will be captured and posted on the Echo website, which you can access via blackboard, any time after the lecture is given. This gives you the ability to listen to (say) a certain topic in a specific lecture as many times as you like.

**SYLLABUS (cont.)**  
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**Spring 2020**

TA's: Erica Bower ([erica.bower@stonybrook.edu](mailto:erica.bower@stonybrook.edu)); office hours Wed  
Di Chen ([di.chen.1@stonybrook.edu](mailto:di.chen.1@stonybrook.edu)); office hours 930-1130 Monday, ESS 104

TOPICS/Chapters

1. CH 1. INTRODUCTION/OVERVIEW (weeks 1-2)
  - a. what is the atmosphere made of? the composition of the atmosphere, past and present
  - b. The atmosphere's physical structure
  - c. introduction to the weatherperson
2. CH 2. WHAT DRIVES WEATHER/CLIMATE? (weeks 2-3)
  - a. The difference among force, work, and heat
  - b. Ways to transfer energy
  - c. Incoming solar radiation and seasonal/geographical variations
  - d. Outgoing radiation; the greenhouse effect
3. CH 3. ATMOSPHERIC TEMPERATURE (weeks 3-4)
  - a. How Earth's temperature varies over time and place
  - b. vertical temperature change: adiabatic processes
  - c. wind chill, heating degree days, cooling degree days, etc.
4. WATER, THE MOST IMPORTANT THING OF ALL\*. (week 5)
  - a. Phase change of water: Evaporation and condensation
  - b. Water vapor and how to measure it

\*This chapter is NOT covered in the ebook, only in CLASS!

5. CH. 6 FORCES: WHY THE WIND BLOWS (weeks 6-7)
6. CH 7. GLOBAL CIRCULATION (week 8)
7. CH 8. OCEAN-ATMOSPHERE INTERACTIONS (week 9)
  - a. ENSO
  - b. Tropical cyclones/hurricanes
8. CH 9. AIR MASSES AND FRONTS (week 10)
9. Global Climate, past and present
10. US Global Change Research Program; what it is (weeks 10-11)
11. Today's situation: Climate forcing, climate feedbacks, and climate intervention (weeks 11-12)
12. Climate forecasting (weeks 13-14)
13. The way of the Future; competing proposals to deal with climactic impacts (weeks 14-15)