

Syllabus for PHYS 459 (Section 1)
Cloud and Precipitation Physics – Fall 2021

Class Location / Times: TTh, 12:15-1:30 PM in RITA 363

Instructor Information: Dr. Mike Larsen

Phone: 843-327-2372

Instructor Email Address: LarsenML@cofc.edu

Office Location: RITA 317

Prerequisite: PHYS112 or HONS158

Prerequisite or Corequisite: MATH323 or PHYS272 or permission of the instructor

Course Webpage: http://larsenml.people.cofc.edu/phys459_fall21.html

(Please see course page for full description of course, rationale, and supplementary information).

Office Hours: Mondays 2-3 PM, Tuesdays 8:30-9:30 AM, and Thursdays 9:30-10:30 AM or by appointment. Office hours will be predominantly handled through zoom unless scheduled otherwise. You can schedule a one-on-one zoom meeting time during the specified office hours by going to <http://www.calendly.com/mikelarsen> If you desire an in-person meeting or would like to schedule a zoom meeting at a different time, please contact me through the course Slack or through email and I will try to come up with a mutually agreeable time and a place to meet.

Official Catalog Course Description

Essential elements of the physics associated with the study of clouds and precipitation.

Attendance Policy: It is expected that you will attend class if you are healthy. I will. We are holding this class in person and plan to continue to do so unless (i) I'm told otherwise by my superiors because the university has decided to pivot, (ii) I have to quarantine or self-isolate, or (iii) a substantial portion of the students in the class have told me they have to quarantine or self-isolate.

If you miss an in-person class, you are still responsible for any material missed including course content, announcements about homework, test date changes, etc.

In the event that you are required to quarantine or self-isolate but the class continues to be held in person, I need you to reach out to me via email or slack in order to discuss accommodations for you during the self-isolation period. It is *your* responsibility to contact the instructor *before any class is missed* in order for an accommodation to be put in place.

In the event that the instructor becomes sick or is otherwise unable to lecture in person, the course will temporarily move to an on-line format during the time that the instructor cannot lecture in person. Depending on your instructor's health, this temporary shift to on-line instruction may be synchronous or asynchronous. Details on such modifications will be conveyed if or when they are necessary.

Course Text:

The *recommended* textbook for this course is:

Pruppacher, H.R. and J.D. Klett (2010). *Microphysics of clouds and precipitation* (2nd Ed.) Springer.

Additional information about this text and other texts you may want to use as supplementary sources can be found at http://larsenml.people.cofc.edu/phys459_texts. Note that the text is recommended, not required. I think it is an excellent resource and it covers a lot of the material we'll be working through this semester. For those of you planning on a career in atmospheric science or meteorology, it is also a standard reference worth having on your shelf.

Plan for Course

As of the moment I am writing this syllabus, the plan is for this course – and all other courses in the Physics and Astronomy department in Fall 2021 – to be fully face-to-face. That being said, we're still in the midst of a global pandemic. Under 42% of state residents are currently fully vaccinated. Early indicators are that our student population has higher vaccination rates than this, but we're nowhere close to universal vaccination – outbreaks are expected.

We have a small class, and I hope (perhaps foolishly) that we can still have something resembling a “normal” semester with minimal interruptions, especially if we are all diligent about getting vaccinated, masking, and social distancing. However, I will keep the tools necessary to transition to on-line instruction ready in case we have to go that way. Please familiarize yourself and keep plugged into the on-line resources relevant to this course (the course webpage, the course Oaks page, and the course slack) so that we will be able to pivot when or if we need to.

While we are face-to-face, please come to class (unless you are sick); I think we have all learned about the value of in-person instruction after over a year of zoom university.

If you are unable to come to class because you are self-isolating (because you tested positive for COVID) or because you are quarantining (because you were a close-contact of someone who tested positive for COVID and you are not vaccinated) it is your responsibility to contact me THE MORNING BEFORE EACH CLASS YOU WILL MISS that you will need me to record that day's lecture. These accommodations are only in place for students self-isolating or quarantining but, in the interest of keeping everyone healthy, I will be willing to extend them to all who feel physically ill. Please don't abuse the accommodations.

To be explicit, if you are unable to come to class because of a need to self-isolate, quarantine, or because you feel unwell you need to either email me, send me a text, or send me a slack DM between 6AM and 9AM on the morning of the day you will be missing class. If I have received such a message, then I will record the class for later viewing (only for those who notified me about

their absence via email, text, or DM) – if I don't get such a message from anyone, no recording will be available. If I get such a message from a classmate but not from you, only your classmate will be given access to the recording.

Recording of Classes

As alluded to above, some classes will be recorded via both voice and video recording and made available to students who notify me before the missed class that they will not be able to attend in person. By attending and remaining in this class, the student consents to being recorded. Recorded class sessions are for instructional use only and may not be shared with anyone who is not enrolled in the class.

Grading

Grades for this class will be based on homework (30%) and exams (70%).

Homework will be assigned approximately weekly and will be due each Thursday at the beginning of class (except on weeks you have a midterm exam). Because your instructor intends to grade homework on Thursday afternoons right after class, late work will not be accepted – but I *will* be dropping your two lowest homework grades for the semester. Note that this is the accommodation I am preemptively making for external complications due to illness or other conflicts. No makeup or extra credit work will be offered and work turned in late will not be graded.

We plan to have three exams for this class – two midterms and a final exam. Each midterm exam will be worth 20% of your grade, and the (cumulative) final exam will be worth 30%. At present, we plan to administer portions of the exam in class and there will be an additional portion of the exam that will be conducted orally – either live in a one-on-one session with the instructor or through zoom as situations warrant. Expectations/rules/guidelines for these exams will be communicated later in the semester.

Grading Scale

The grading scale applied to this class will be *no more stringent than*:

A	91-100	B-	80-81	D+	69-70
A-	90-91	C+	79-80	D	61-69
B+	89-90	C	71-79	D-	60-61
B	81-89	C-	70-71	F	<60

In practice, it is frequently the case the actual final grading scale applied to the course will be more generous than what is noted above.

The rest of this syllabus consists of statements that are required for assessment or the specific language used is mandated by CofC administration. I believe some of this information is very important, but I assume you get the same information in every syllabus so I have put the remaining content on its own portion of the syllabus to make it easier for you to distinguish between the items specific for this course and the items that appear on all syllabi.

Required Objectives and Outcomes Statements

In order to meet assessment requirements, it is necessary to include course objectives and learning outcomes for every course. Here they are for this course.

Learning Objectives

This course endeavors to aid the motivated student in the following tasks:

- Learn about the basic physical properties and processes in clouds.
- Understand principles and processes governing the creation, motion, and growth of airborne particles.
- Apply basic physics principles to the realm of atmospheric microphysics.
- Develop and refine problem solving and critical thinking skills.

Learning Outcomes

At the end of this course, successful students will be able to:

- demonstrate an understanding of homogeneous and heterogeneous nucleation of water droplets and ice crystals.
- analyze and describe the underlying physics regarding the hydrodynamics and equilibrium behavior of cloud and precipitation particles.
- quantitatively and qualitatively describe basic processes that occur in atmospheric microphysics.
- draw scientifically valid conclusions based on observations and data.

Required Syllabus Statements

The university requires us to include some standard (so-called “boilerplate”) text into all syllabi. Since you presumably see the same text in all of your classes, I have grouped these statements together.

Honor Code and Academic Integrity

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when suspected, are investigated. Each incident will be examined to determine the degree of deception involved.

Incidents where the instructor determines the student’s actions are related more to misunderstanding and confusion will be handled by the instructor. The instructor designs an intervention or assigns a grade reduction to help prevent the student from repeating the error. The response is recorded on a form and signed both by the instructor and the student. It is forwarded to the Office of the Dean of Students and placed in the student’s file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This status indicator will appear on the student’s transcript for two years after which the student may petition for the XX to be expunged. The F is permanent.

Students can find the complete Honor Code and all related processes in the *Student Handbook* at <http://deanofstudents.cofc.edu/honor-system/studenthandbook/>

Students with Disabilities

The College will make reasonable accommodations for persons with documented disabilities. Students should apply at the Center for Disability Services/SNAP located on the first floor of the Lightsey Center, Suite 104. Students approved for accommodations are responsible for notifying your professor as soon as possible and subsequently contacting your professor again at least one week before any specific accommodation is needed.

Oaks

OAKS, including Gradebook, will be used for this course throughout the semester to provide the syllabus and class materials and grades for each assignment, which will be regularly posted.

Inclement Weather, Pandemic, or Substantial Interruption of Instruction

If in-person classes are suspended, faculty will announce to their students a detailed plan for a change in modality to ensure the continuity of learning. All students must have access to a computer equipped with a web camera, microphone, and internet access. Resources are available to provide students with these essential tools.

Mental and Physical Wellbeing

At the college, we take every students' mental and physical wellbeing seriously. If you find yourself experiencing physical illnesses, please reach out to student health services (843-953-5520). And if you find yourself experiencing any mental health challenges (for example, anxiety, depression, stressful life events, sleep deprivation, and/or loneliness/homesickness) please consider contacting either the Counseling Center (professional counselors at <http://counseling.cofc.edu> or 843-953-5640 3rd Robert Scott Small Building) or the Students 4 Support (certified volunteers through texting "4support" to 839863, visit <https://counseling.cofc.edu/s4s/index.php>, or meet with them in person 3rd Floor Stern Center). These services are there for you to help you cope with difficulties you may be experiencing and to maintain optimal physical and mental health.

Food and Housing Resources

Many CofC students report experiencing food and housing insecurity. If you are facing challenges in securing food (such as not being able to afford groceries or get sufficient food to eat every day) and housing (such as lacking a safe and stable place to live), please contact the Dean of Students for support (<http://studentaffairs.cofc.edu/about/salt.php>). Also, you can go to <http://studentaffairs.cofc.edu/student-food-housing-insecurity/index.php> to learn about food and housing assistance that is available to you. In addition, there are several resources on and off campus to help. You can visit the Cougar Pantry in the Stern Center (2nd floor), a student-run food pantry that provides dry-goods and hygiene products at no charge to any student in need. Please also consider reaching out to Professor Larsen if you are comfortable in doing so.