

Syllabus

Course Topics

Lightning Phenomenology and Epistemology
 Cloud-to-Ground Lightning
 Intra-Cloud Lightning
 Stuff we don't know!

Physics of Lightning
 Conventional Discharge Physics
 Electromagnetic Radiation of Lightning
 Optical Emissions of Lightning
 Thunder
 Relativistic Runaway Electron Avalanche phenomena and x-rays

Meteorology and Lightning
 Lightning Characteristics vs. Storm Severity
 Thunderstorm Models with Lightning

Lightning Hazard-Warning Decision Support
 Principles of Lightning Protection

How the Course will Work

This course will be self-contained to the extent possible. I will try to cover core aspects of each topic necessary for you to understand it to a reasonable depth without having to go to numerous outside resources, though I will provide references on some subjects for you to look up outside of class. To that end, I have placed the following on reserve in the library:

Lightning: Physics and Effects, Rakov and Uman, Cambridge, 2007, ISBN 0521035414

The Electrical Nature of Storms, MacGorman and Rust, Oxford, 1998, ISBN 0-19-507337-1

I will provide references to relevant sections of these texts as we go and I will give you urls, handouts to read and sets of problems to solve. I intend to give lectures over most of the material of interest, but some of the problems may depend mainly on information in the handouts or that you will need to find online or in the references. I will provide relevant example problems to help you with the problem sets.

Grades (Please see the tentative schedule provided below to get an idea of how this will work.)

7 graded problem sets	40%
6 short quizzes	60%

Tentative Schedule

Schedules are made to be broken, and my experience is that something always goes wrong, but nonetheless it is salutary at least to start with some idea of how things will go, and then be willing to adapt if and as necessary. So here is what I have in mind:

1/15	first meeting, DQ, survey
1/17	Syllabus, overview of Earth in Space from an electrical point of view
1/22	no class, ps1 assigned, materials provided online
1/24	no class
1/29	ps1 due, lecture
1/31	ps1 returned, discussion, lecture
2/05	q1, ps2 assigned, lecture

2/07 lecture
2/12 ps2 due, lecture
2/14 ♥ ps2 returned, discussion, lecture
2/19 q2, ps3 assigned, lecture
2/21 lecture
2/26 ps3 due, lecture
2/28 ps3 returned, discussion, lecture
3/04 q3, ps4 assigned, lecture
3/06 lecture
3/11 ps4 due, lecture
3/13 ps4 returned, discussion, lecture
3/25 q4, ps5 assigned, lecture
3/27 lecture
4/01 ps5 due, lecture
4/03 ps5 returned, discussion, lecture
4/08 q5, ps6 assigned, lecture
4/10 lecture
4/15 ps6 due, lecture
4/17 ps6 returned, discussion, lecture
4/22 q6, ps7 assigned, lecture
4/24 lecture
4/29 ps7 due
5/01 ps7 returned, discussion, lecture
5/07 10:30 AM final exam period: safety valve

I propose to make up the missed classes by holding special problem solving sessions from time to time during the semester. If absolutely necessary, we might use final exam period for catch up.

Academic Misconduct

Academic misconduct is defined as "any act that improperly affects the evaluation of a student's academic performance or achievement." All faculty at the University of Oklahoma expect academic integrity from each student. Misconduct such as plagiarism, submission of work for more than one class, fabrication, and fraud, as well as attempting to commit such act or assisting others in so doing, will not be tolerated. Students are responsible for knowing the OU Academic Code, which can be found at <http://www.ou.edu/studentcode>.

Integrity Pledge (required on all work)

On my honor, I affirm that I have neither given nor received inappropriate aid in the completion of this exercise (quiz, examination, paper, etc.).

Name: _____ Date: _____

For background on the Integrity Pledge and the Honor Council, please go to <http://www.ou.edu/honorcouncil/>

Reasonable Accommodation Policy

The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are requested to speak with the professor as early in the semester as possible. Students with disabilities must be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405/325-3852 or TDD only 405/325-4173.