

## ASTR/ATOC 3720: Planets and Their Atmospheres

### **Course Description:**

This course provides an introduction to the physics and chemistry of the atmospheres of planets and satellites in our solar system. We will explore the fundamental nature of atmospheres, their origin and evolution as well as their composition, structure, and variability. There will be an emphasis on the inter-comparison of atmospheres in our solar system to understand how and why they are different and are similar, and then on extending this understanding to planets outside our solar system. Discussion will also include the intimate connection between atmospheres and life.

*Prerequisites:* Phys. 1110 and 1120, and either Math 1300 and 2300, or APPM 1350 and 1360, or instructor consent

### **Lectures**

Tuesdays and Thursdays, 2:00pm—3:15pm, Duane G131

### **Contact Information:**

*Instructor:* Dr. Frank Eparvier

*Office:* Room 211, LASP Space Technologies Building (1234 Innovation Dr., the building with the dome on the roof and antenna out front, in the CU Research Park about a mile east of campus on Colorado Blvd)

*Phone:* 303-492-4546

*E-mail:* [eparvier@colorado.edu](mailto:eparvier@colorado.edu)

*Class Website:* through webct

*Office hours:* By appointment only! I will be happy to schedule meetings with individuals or groups, and will respond to e-mail as promptly as possible.

### **Course Materials:**

*Required Textbooks:*

- “The New Solar System”, 4<sup>th</sup> edition, by Beatty, Collins-Peterson, and Chaikin, available at the bookstore, make sure you have the 4<sup>th</sup> edition!
- “Atmospheres”, by Goody and Walker, out-of-print, but photocopied version is available at the bookstore; make sure you can read the copy you get!

*Required Equipment:*

- A scientific calculator which at least can do: scientific notation, exponentials, logarithms, and trigonometric functions
- A brain

### **Grades:**

Course grades are based on: 20% for each Midterm Exam, 30% on the Final Exam, 20% on homeworks and projects, and 10% on classroom participation.

### **Legal Mumbo-Jumbo:**

- If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services (DS) early in the semester so that your needs may be addressed. DS determines accommodations based on documented disabilities (303-492-8671, Willard 322, <http://www.colorado.edu/sacs/disabilityservices>)
- If you have a conflict between religious observance dates and course examination or assignment due dates, you should notify me at least two weeks in advance so accommodations can be made (See the official policy on this at [http://www.colorado.edu/policies/fac\\_relig.html](http://www.colorado.edu/policies/fac_relig.html)).
- If I don't like your behavior in class, these are the things I'm allowed to do to you without getting myself into trouble: <http://www.colorado.edu/policies/classbehavior.html>.
- Follow the honor code and you won't get in trouble: (<http://www.colorado.edu/academics/honorcode/>).

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**SYLLABUS for Spring 2003**

Below is a rough breakdown of the semester's schedule, with topics covered. All dates are to be considered tentative.

**Week 1 (1/14—1/16): Introductions and Overviews**

- Quick tour of the solar system and its atmospheres
- Formation of solar systems

**Weeks 2—7 (1/21—2/27): Basics of Atmospheric Science**

- What is an atmosphere anyway?
- Gravity and behavior of gases
- Temperature structures of atmospheres
- Radiative transfer (interaction of light with gases)
- Atmospheric chemistry
- Atmospheric dynamics and circulation
- Climate and weather

**Quiz #1: Tentatively 2/27**

**Weeks 8—12 (3/4—4/3): Evolution of Atmospheres and Comparative Atmospheres**

- Origin of atmospheres
- Atmospheric production and loss processes
- The role of water
- The terrestrial planets
- Satellites with atmospheres
- The giant planets

**Week 11 (3/25—3/27): Spring Break, NO CLASSES**

**Quiz #2: Tentatively 4/8**

**Weeks 13—16 (4/10—5/1): Life and Atmospheres**

- Origin of life: what does it take?
- Effects of life on an atmosphere (and an atmosphere on life)
- Anthropogenic change
- Planets beyond our solar system
- Life in the universe

**FINAL EXAM: 5/7, 1:30pm-4:00pm, Cumulative**

**In addition to the two quizzes and the final exam, there will also be readings, homeworks, and a semester project, which will be announced during class.**