

**ESS 102: Space and Space Travel
Winter 2008**

Location: Lectures JHN 102; Computer Labs JHN 021; Hands-on Labs JHN 011

Instructor: Dr. Jeremy N. Thomas (Johnson 243, 206-543-9586, jnt@u.washington.edu)

Teaching Assistants:

- James Prager (Johnson 275A, jprager@u.washington.edu)
- Race Roberson (Johnson 240 and 275A, raceman@u.washington.edu)
- Michael Shimogawa (Johnson 240, shimo@u.washington.edu)

Office Hours: Dr. Thomas: Mon and Wed 2-4pm or by appt.

Course Objectives:

- Explore the following topics: basics of light and matter, powering of the sun, making of space weather conditions, observations from space and from Earth, Earth's space environment, radiation belts and hazards, plasma storms and auroras, electron beams, spacecraft requirements, tooling up for manned exploration.
- Learn basic problem solving techniques.
- Learn basic observing and experimental techniques.
- Write a scientifically correct paper.

Prerequisites: Basic math skills, such as scientific notation and algebra

Textbook (required): *Sun, Earth, and Sky*, Second Edition, by Kenneth Lang, Springer, 2006.

Class Room Clickers (required): TurningPoint

Class Web Site:

<http://www.ess.washington.edu/Space/ESS102/>

Grading:

There are five factors in the grade:

- (1) *Weekly Assignments* – Lecture, Written, Demo and Computer Labs [30%]
- (2) *Hands-on Projects* - Telescope Run and Water Rocket Competition [10%]
- (3) *3 Tests* – Key Concepts [total of 30%]
- (4) *Writing Project* - Write a scientifically correct science fiction article [25%]
- (5) *Classroom Participation* [5%]

HW: Almost weekly online assignments via Moodle and 1 or 2 written problems to be turned-in

Lab Sections: Meet twice a week. Hands-on lab to reinforce lecture topics and computer based exploratory assignments. Also, time will be set aside to teach problem solving techniques. Assignments via Moodle and to be turned-in.

Final Paper: Write an original scientifically-correct news/science fiction article (approx. 6 pages). Details TBA.

Tests:

- 3 Tests (50 minutes each) with multiple choice, short answer and 1 or 2 problems to work-out.
- Tests 1 and 2 will be held during computer lab on approx. Jan. 29/31 and Feb 19/21.
- Test 3 on March 14 during final lecture period (NO FINAL DURING EXAM WEEK)

Grading Policies*Written Assignment Due Dates:*

All weekly homework that needs to be turned into the TAs will be due in the following computer lab section on either Monday or Tuesday. No assignments will be accepted electronically (by email). You must physically hand them in, except for the on-line components which will also have a one-week duration.

Late Policy:

Without PRIOR approval of your TA, no assignments of any kind will be accepted after the due date.

Missed-lab Policy:

There will be NO make-up labs. If you need to miss your lab section, plan to attend another section instead. Attendance will be taken in each section and will affect your participation grade. TAs will drop the lowest demonstration lab and the lowest computer lab scores at the end of the term.

Missed-test Policy:

The three tests will be in either computer lab or lecture. Make up tests are only available to those who are traveling on exam day and who MAKE PRIOR arrangements with their TAs or documented extenuating circumstances.

Tentative Weekly Schedule:

<u>Week</u>	<u>Topics</u>
1	The big picture: Overview and introduction to space.
2	Matter and light: Atoms, spectra, solar power
3	Layers of the Sun: The core, radiative, and convective zones
4	The magnetic Sun and the solar atmosphere (Test 1 on about Jan 29/31)
5	Planetary magnetic fields and the solar wind
6	Space Weather: Aurora, radiation belts, and space hazards (1 st draft of paper due, TBA)
7	Planetary motion and orbital mechanics (Test 2 on about Feb 19/21)
8	Rockets and propulsion
9	Solar system formation (Paper due, TBA)
10	Exploring the solar system (Test 3 on March 14)

TBA: A few guest lecturers who are experts in particular field of space science.