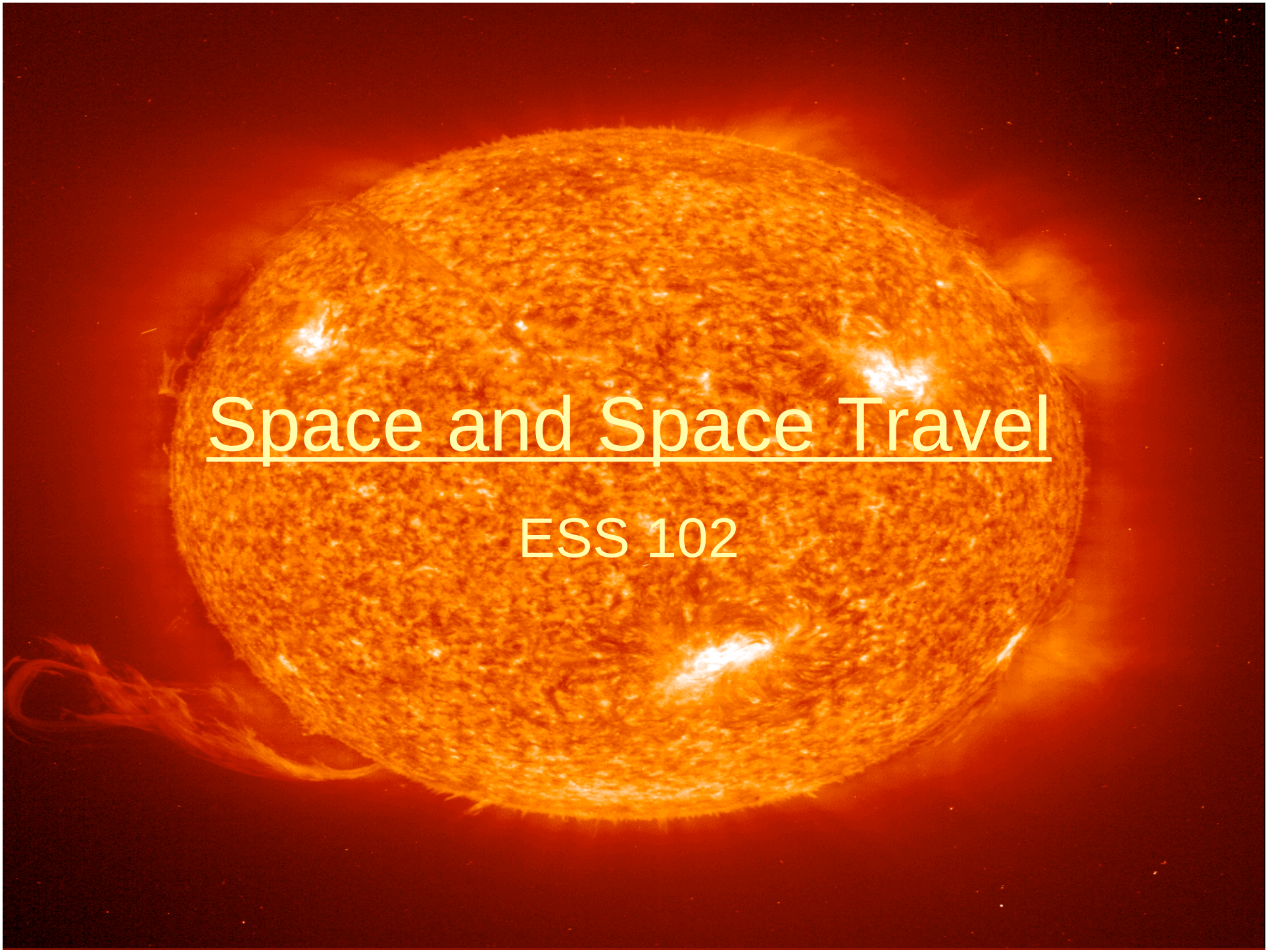

Space and Space Travel

ESS 102

Space and Space Travel

Lecturers:

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Space and Space Travel

Course Objectives:

1) *To Describe the Properties of the Space Environment and the Sun.*

2) *To explore how the Earth and planets interact with space, and how this interaction affects our environment.*

3) *To Examine the Methods, Challenges, and Future of Space Exploration for both Human and Robot Probes.*

4) *To Introduce the Explorable Inventory of the Solar System and the Targets of Current Interest.*

Space and Space Travel

Learning Materials:

1) Textbook ***"Sun Earth & Sky"*** by K. R. Lang

2) Web Site ***www.ess.washington.edu/Space/ESS102/***

3) Weekly Web Site(s) of Interest:

4) Moodle (We'll get to this in a minute):

Space and Space Travel

Course Expectations:

1) Basic Understanding of Physics and Chemistry:

   (*Atoms, Molecules & their Parts, Energy, Waves, and Momentum*)

2) Ability to use Basic Mathematical Techniques:

   (*Algebra, Geometry, and Scientific Notation*)

3) Computer Literacy:

   (*Internet, E-mail, and Calculator*)

4) Attendance and On-Time Submission of Assignments:

   (*Writing assignments submitted after the week due can not be accepted without valid excuse - Moodle assignments have defined time periods during which they can be done.*)

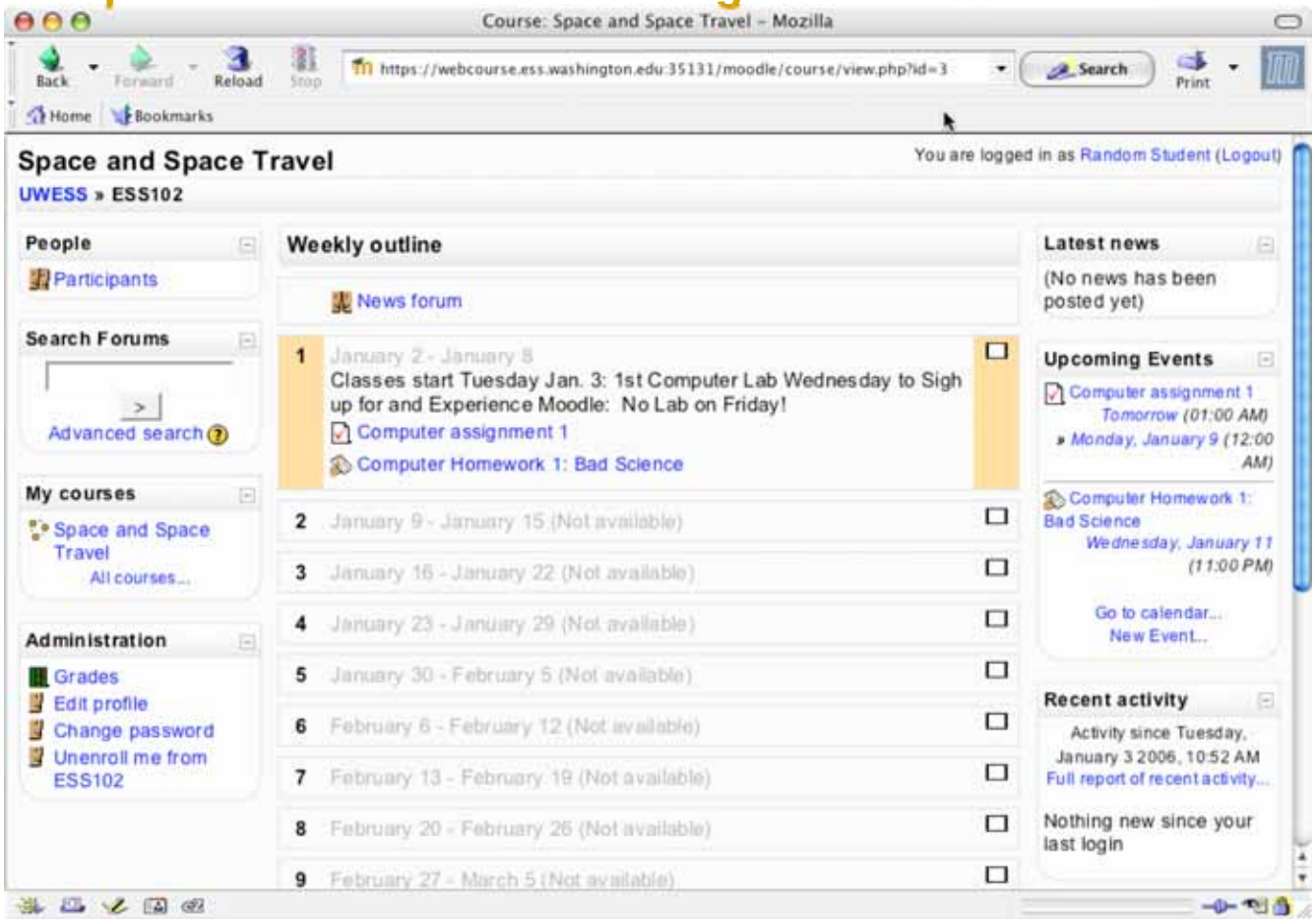
Space and Space Travel

Course Elements:

1) Lecture, Homework, Quizzes, and Computer Labs.

The primary vehicle for this section of the course is ***Moodle***.

https://webcourse.ess.washington.edu.35131/moodle/



Space and Space Travel

Course Elements:

2) Experiential Learning.

2a) Weekly Laboratory: (Fridays-None this week!).

2b) Solar Viewing: (*if* we get a sunny day).

2c) Propulsion Lab: (How far can water get you?).

2d) Water Rocket!!!

Come Fly With Us

ESS 205 - Access to Space

Spring Quarter 2006 – 5 Credits

Build an experiment to fly on a balloon at 100,000 ft
No Prerequisites, Open to all Majors!
Offered by Dept. of Earth and Space Science

http://www.ess.washington.edu/Space/ESS205/

Space and Space Travel

Course Elements:

3) The Writing Component (credit):

3a)	Rocket Project Report	20%
3b)	Scientifically correct article.	80%

Secrets to success on the writing component!

1) *Working* together = Good: ***Writing*** together = Bad

2) Use your **own** words *(aka: If you can find it on the web, **we** can find it on the web)*

Space and Space Travel

Course Content and Grading:

1) Weekly Assignments based on text and lectures.
2) Weekly Hands-On Concepts Lab. (127 JHN)
3) Weekly Computer Lab. (21 JHN)

} 30%

4) 3 Quizzes. 30%
5) Writing projects. 40%

Secret to Success: *Do ALL of the assignments!*

A POP QUIZ!!!

1) Astronauts are weightless because there is no gravity in space.

False!!!

2) Visible sunlight plays no role in the upper atmosphere and space.

True!!!

3) The most difficult challenge in human space flight is the lack of air.

False!!!

4) The major limitation to space travel is the weight of experiments.

False!!!

5) The Earth's magnetic field is essential for the existence of life.

False!!!

6) The Sun is hotter now than it was during the time of the dinosaurs.

True!!

7) Rockets work by pushing off from the launch pad and air.

False!!!

Space and Space Travel

Topic 1: Foundation

1) A Brief Inventory of the Solar System and our reasons for studying it.
2) Highlights of Space Exploration.
3) Physical Perspectives on the Scale of the Solar system.
    - *How Big?*
    - *How Far?*
    - *How Hot?*
    - *How Much?*
    - *How Long?*
4) The Nature of Light and Light Propagation.

Exploring our Star System: Why do it?

The Copernican Principle:

Any observation that suggests our position in the Universe is somehow unique or special is wrong or incomplete.

What we know:

We live in a star system that contains a single central Sun with several planets of different types orbiting it.

Our Hypothesis:

*This is **NORMAL**.*

Is this true and what does it mean???

Our Local Inventory:

What makes up our star system?

1) A single central star with a temperature of 5785K.

2) Two *sub-stellar* giant planets of roughly solar composition. ***(Jupiter & Saturn)***

3) Two *icy-gas* hybrid planets. ***(Uranus & Neptune)***

All of the above planets have large systems of satellites; some planet sized. *(Io, Europa, Ganymede, Callisto, Titan, and Triton)*

4) Four much smaller rocky (iron-nickel-silicate) planets. ***(Mercury, Venus, Earth, and Mars)***

5) Two areas of remnants from planet formation, one rock based ***(Asteroid Belt)*** and one ice-based ***(Kuiper Belt)***.

6) An extended distribution of ejected debris located well past the planets. ***(Oort Cloud)***

Exploring our Star System How and Where?

History is Written in what we see:

The distribution, composition, and evolution of material in the solar system tells us how we got from a cold cloud of gas & dust to the present:

1) How did the Sun form and evolve?

2) How do planets form and where?

3) What does the distribution of planets and debris tell us about the early solar system?

4) How do planets change with time and what are the processes involved?

5) How does the interaction with the Sun affect conditions on a planet on various time scales?

6) What does our system tell us about others?

Space and Space Travel

Milestones in Space Exploration (1900-1970):

1) 12/17/1903: First Human Flight.
2) 1/13/1920: R. Goddard Rocket Propulsion Treatise.
   (NY Times Blasts Goddard)
4) 3/26/1926: Launch of First Liquid Fuel Rocket.
5) 10/04/1957: Sputnik 1 Orbits Earth.
6) 4/12/1961: Yuri Gargarin Orbits Earth.
7) 12/14/1962: Mariner 2 Flies by Venus.
8) 7/16/1969: Apollo 11 Lands on Moon.
   (NY Times Apologizes to Goddard)