

Course Syllabus for AST 364: Solar System Astronomy

Instructor

Sally Dodson-Robinson

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Course

Meeting times: Monday, Wednesday, Friday 9:00-9:50 AM

Location: RLM 15.216B

Unique number: 48015

Website: All course material will be posted on Blackboard

TA

Andrew Riddle

RLM 16.220

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Office hours

Monday 10:00-11:00

TA: to be announced

Wednesday 10:00-11:00

Prerequisites

PHY 316 Electricity & Magnetism

PHY 116L Electricity & Magnetism Lab

Course description

AST 364 introduces the physics and chemistry of planetary systems to students with at least one year of undergraduate-level math and physics preparation. Topics include orbital dynamics, planet formation, planetary interior structure, atmospheric physics and chemistry, and surface geological processes. We will also discuss the origins, structures and orbits of comets, asteroids and planetary satellites. We will end with an overview of the extrasolar planets, over 2,000 of which have been discovered as of January 2013. Much of what we will cover has been discovered within the last five years.

Materials required

Handouts: The best upper-division planetary science book available, *Physics and Chemistry of the Solar System* by John S. Lewis (2004, Elsevier Academic Press), is unfortunately out of print. You will be given excerpts from that book and others as handouts.

Note-taking materials: I use PowerPoint only to show pictures and do not post lecture notes online. The notes you take in class will be important study resources.

Calculator and computer access: At least one homework assignment will require a computer with Java 1.5 or 1.6. The computers in the RLM 15th or 16th floor computer labs will work for this assignment.

Grading

Homework assignments count for **30%** of the course grade. There will be seven assignments due during the semester. I will drop the lowest assignment score from your grade.

Journal article reviews count for **20%** of the course grade. You will review three journal articles during the semester.

Tests count for **50%** of the course grade. There will be four tests during the semester. The **optional final exam** is on Wednesday, May 8. If you choose to take the final exam, it will replace your lowest test score. If you are happy with your grade at the end of the semester, there is no need to take the final exam.

Grading scale used for final grades:

		A	100-94%	A-	93-90%
B+	89% - 87%	B	86-84%	B-	83-80%
C+	79% - 77%	C	76%-74%	C-	73-70%
D+	69-68%	D	67-66%	D-	65%
		F	Below 65%		

Please note that all work, including tests, must be **neatly written and easily readable** in order to receive a grade.

Late work

I do not accept late homework unless you have a **documented excuse** for the time the homework was due (i.e. doctor's note, letter from Athletic Dept.). Make-up quizzes will not be given except for students with religious holidays (see below) or **documented** illnesses. To receive a make-up quiz because of illness, you must (a) notify the instructor you cannot attend **before** the start of the quiz, and (b) provide a doctor's note with date, time and verification of illness.

Accommodations for students with disabilities

At the beginning of the semester, students with disabilities who need special accommodations should notify the instructor by presenting a letter prepared by the Service for Students with Disabilities (SSD) Office. The University of Texas provides

upon request appropriate academic accommodations for qualified students with disabilities. To ensure that the most appropriate accommodations can be provided, students should contact the SSD Office at 471-6259 or 471-4641 TTY.

Course Schedule

Unit 1: Solar system formation and dynamics

- Why do planets exist? – January 14-16
- Star formation and angular momentum – January 18
- Protostellar disk physics – January 23
- Core accretion – January 25
- Equations of planetary motion – January 28-February 1
- Tides and rotation – February 4-6
- **Assignments due** – January 28, February 6
- **Test 1** – February 8

Unit 2: Giant planets and their satellites

- Giant planet interiors and energy budget – February 11-13
- Atmospheric temperature and pressure – February 15
- Cloud physics – February 18
- Ice giant interiors – February 20
- Neptune's heating problem – February 22
- Icy moon overview – February 25
- Tides, resonances and moon surfaces – February 27
- Planetary rings – March 1
- **Assignments due** – February 18, March 1
- **Journal article review due** – February 25
- **Test 2** – March 4

Unit 3: Terrestrial planets and airless rocky bodies

- Moon and Mercury formation – March 6
- Impact cratering – March 8
- Mars formation and energy budget – March 18
- Water and other volatiles on Mars – March 20
- Venus and the runaway greenhouse effect – March 22
- Plate tectonics in the inner Solar System – March 25
- Earth interior and heat source – March 27
- Seismology – March 29
- Earth atmosphere and climate history – April 1-3
- **Assignments due** – March 20, March 29
- **Journal article review due** – April 3
- **Test 3** – April 5

Unit 4: Comets, asteroids and exoplanets

- Comet motion – April 8
- Comet chemistry – April 10
- Kuiper Belt and Oort Cloud – April 12
- Large KBOs – April 15
- Meteorite classification and NEO orbits – April 17
- Main-belt asteroids – April 19
- Exoplanet discovery methods – April 22-24
- Supergiant exoplanets/brown dwarfs – April 26
- Giant exoplanets – April 29
- Terrestrial exoplanets and Drake’s Equation – May 1
- **Assignment due** – April 22
- **Journal article review due** – May 1
- **Test 4** – May 3

Attendance and religious holidays

I will not take attendance in lectures. However, as your lecture notes will be an important study resource, I strongly encourage you to attend.

It is the policy of The University of Texas at Austin that the student must notify each instructor at least fourteen days prior to the classes scheduled on dates he or she will be absent to observe a religious holy day. For religious holidays that fall within the first two weeks of the semester, the notice should be given on the first day of the semester. The student may not be penalized for these excused absences but the instructor may appropriately respond if the student fails to complete satisfactorily the missed assignment or examination within a reasonable time after the excused absence.

Scholastic honesty

Students who violate University rules on scholastic dishonesty will receive zero credit for the assignment or quiz on which dishonesty occurred. In addition, the Astronomy Department or University may impose further disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Standards for Academic Integrity are posted at http://deanofstudents.utexas.edu/sjs/acint_student.php .

Laptops

I strongly discourage laptop use during class, as brightly lit screens are distracting to everyone nearby (including the instructor). However, if you must take notes on your laptop rather than by hand, please sit in the back row.