

ASTR 8850: Planetary Sciences

Fall 2024 ★ Tue/Thu 11:00 AM – 12:15 PM ★ 25 Park Place / Room 628

Instructor: Professor Todd Henry

25 Park Place / Room 618

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research: nearby stars, stellar masses, exoplanets, astrobiology

Office Hours: by appointment

Prerequisite: ASTR 6000 or equivalent

Textbook: *Planetary Sciences* by de Pater and Lissauer (1st or 2nd edition, recommended)

Course Objectives: To expose graduate students to the study of Planetary Sciences. Topics will include Solar System formation, dynamics, planetary atmospheres, surfaces, and interiors, energy sources, and life in the Universe. Special emphasis will be placed on Earth, Mars, Europa, Enceladus, and Titan, and relatively new classes of objects — Trans-Neptunian Objects and extrasolar planets. The nascent field of Astrobiology, the search for and study of extraterrestrial life forms, will be explored.

Grades (approximate):

Research Paper	40%
Presentation	20%
Homework Assignments	20%
In-Class Participation	20%

How to Do Well in This Class: The following are highly recommended: (1) showing up to class on time, (2) being an active participant during class, (3) doing the homework, and (4) getting an early start on the primary component of the course, the research paper. Students are expected to do their own work. Certainly, discussions of more difficult problems with other students is acceptable (and encouraged), but work that is turned in must be your own. Under no circumstances will duplication on assignments or plagiarism in the research paper be tolerated. **Furthermore, do not rely on AI to develop or write your research paper.**

Dates to Remember:

DEC 05 — Research Papers Due at 5PM Thursday.

DEC 10 — Reviews Due at 5PM Tuesday.

Lecture Topics: The following is an approximate list of topics for the course. Changes will likely occur, but this is the map for our quest across the Solar System ... and beyond ...

Dates	Lecture Topics	Chapters	Project
AUG 27	Solar System Explorers	1	
AUG 29	Solar System Overview I	1	
SEP 03	Solar System Overview II	1	
SEP 05	Solar System Overview III	1	
SEP 10	Solar System Formation I	13	Level 0: topics
SEP 12	Solar System Formation II	13	
SEP 17	Dynamics I	2	
SEP 19	Dynamics II	2	
SEP 24	Solar Heating	3	
SEP 26	Energy Transport	3	
OCT 01	Atmospheres I	4	Level 1: outline
OCT 03	Atmospheres II	4	
OCT 08	Atmospheres III	4	
OCT 10	Weather	4	
OCT 15	Surfaces I	5	
OCT 17	Surfaces II	5	
OCT 22	Surfaces III	5	
OCT 24	Interiors I	6	
OCT 29	Interiors II	6	Level 2: draft
OCT 31	Minor Bodies out to Jupiter	9	
NOV 05	Minor Bodies beyond Jupiter	9, 10	
NOV 07	Titan, Earth, Europa, Enceladus, Mars I	various	
NOV 12	Life on Earth	—	
NOV 14	Exoplanets / Life Not on Earth	—	
NOV 19	Student Presentations	—	
NOV 21	Student Presentations	—	
NOV 26	TURKEY BREAK	no class	
NOV 28	TURKEY BREAK	no class	
DEC 03	Solar System Explorers Finale (remote)	—	Level 4: final paper
DEC 05	RESEARCH PAPERS DUE (Thursday)	—	
DEC 10	REVIEWS DUE (Tuesday)	—	