

Astronomy ASTC25

Astrophysics of Planetary Systems

Winter 2014

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Office Hours: Tuesday, 10-12noon and by appointment

TIME & PLACE:

Thursdays, 11am-12noon, BV 361 & 1pm-3pm, BV 355

DESCRIPTION:

The fast pace of discoveries on extrasolar planets is remarkable. Many aspects of our understanding of the Solar System have been challenged by the very diverse properties of known extrasolar planetary systems. No single textbook provides an up-to-date view of the field. This class will provide students with the basic knowledge necessary for understanding the Solar System and to follow the recent progress on extrasolar planets.

TOPICS:

- Current Status and Future Prospects
- Detection/Measurement Methods for Extrasolar Planets
- Protoplanetary Disks
- Planet Formation
- Orbital Evolution
- Internal Structure & Evolution of Planets
- Habitability

PREREQUISITES:

A working knowledge of calculus and calculus-based general physics.

Prerequisite: MATB41H3 & PHYA21H3

Corequisite: MATB42H3

Exclusion: (ASTB21H3), (ASTC22H3), [AST221H & AST222H]

Breadth Requirement: Natural Sciences

TEXTBOOK:

Class notes and presentation slides will be distributed when relevant.

PROBLEM SETS:

Handed out in class and posted on this website, approximately every other week (total of 4-5). Due one week later.

Policy on collaboration: You are welcome to discuss the problems with fellow students, but you must write your own solutions, individually.

Policy on late problem set returns: In order to be fair to those who turn assignments in on time, points will be deducted on assignments turned in late.

GRADING:

Problem sets: 40%

Midterm exam: 25%

Final exam: 35%

APPROXIMATE SCHEDULE:

1. Introduction, organisation and overview
2. Proto-stellar formation and evolution
3. Infrared excesses and passive protoplanetary disks
4. Protoplanetary disk accretion, evolution and dispersal
5. Dust and planetesimal formation
6. Giant planet formation
7. Terrestrial planet formation
8. Gaseous migration (type I and II)

9. Planet-planet gravitational scattering and long-term orbital evolution
10. Internal structure of giant and terrestrial planets
11. Atmospheres of giant and terrestrial planets
12. Terrestrial planet atmospheres and habitability
13. Current and future detection/measurement methods for exoplanets