

# Astronomy 138 Syllabus summary

(Enrolled students should check the course Canvas page for the full syllabus)

138 [PSCI] Planets and Planetary Systems 3 Course Prerequisite: ENGLISH 101 or HISTORY 105. Formation and dynamics of planetary systems; major planets: interiors, surfaces, atmospheres; minor planets: moons, asteroids, comets; science missions; extrasolar planets.

Course format: 3 lectures per week

## Course materials

- Annotation application: Perusall
- Student response application: iClicker
- Exercise book: *Planetary Astronomy In-Class Exercises* by Duez, Prather, et al, ISBN: 9780137792597 (Pearson eText)
- Textbook: *Astronomy*, by Fraknoi, Morrison, and Wolfe (OpenStax)

## Grade Weighting

In-class activities	20%
Quizzes	25%
Annotations	20%
Homework	35%
Total	100%

## Learning outcomes

By the end of this course, the successful student will demonstrate a working knowledge of planets and planetary systems by:

- being able to explain how astronomers claim to know the masses, ages, compositions, speeds, etc of planets both inside and outside our solar system
- being able to use properties of the force of gravity, blackbody radiation, and energy and angular momentum conservation to reason about the formation and evolution of planets

This course satisfies the [PSCI] requirement for WSU's University Common Requirements (UCORE), which is designed to help you acquire broad understanding, develop intellectual and civic competencies, and apply knowledge and skills in real world settings.

## List of topics

- Solar system overview, including gross characteristics of the planets, their orbits, compositions, and appearances
- **Orbital dynamics:** conservation laws, Kepler's and Newton's laws, tidal forces, 3-body effects (especially resonances), stability and chaos, rings and disks
- **Electromagnetic radiation and energy transport:** spectral lines, doppler effect, blackbody radiation, transport by radiation, conduction, convection
- **Exoplanets:** detection methods, demographics
- **Terrestrial planets:** inferring surface ages and interior structure, atmospheric thermodynamics, greenhouse effect, gas retention and escape
- **Planetary system formation:** protostars and protoplanetary disks, planetesimals, origin of the moon, planet migration
- **Habitability:** habitable zones, detecting life