



PTYS568 Exoplanets: *Discovery & Characterization*

Kuiper Space Sciences 434, time: Mon/Wed 9:30 – 10:45am

Description of Course

This course will cover observational and theoretical ideas pertinent to planets orbiting stars other than the Sun. Discovery and characterization techniques will be emphasized along with associated theory. The format will alternate from traditional lectures, guest lectures by local or visiting experts, and student-lead presentations.

Course Prerequisites or Co-requisites

All students enrolled in the astronomy, physics, planetary science, and optical science PhD programs are welcome to take this class. Exceptions can be made on a case-by-case basis.

Instructor and Contact Information

Prof. Travis Barman
Office: Kuiper Space Sciences 436
Office hours by appointment
Email: barman@lpl.arizona.edu

Course Topics

Part 1 (*Exoplanet Discovery*)

Introduction & Background

Radial Velocity

Transit

Astrometry, TTV, Micro-lensing

Direct Imaging

Exoplanet distributions (mass, period, etc.)

Planet Formation & Migration

Guest Lectures: TBD

Part 2 (*Exoplanet Atmospheres and Interiors*)

Interiors

Atmospheric Structure and Radiative Transfer

Chemistry

Opacities

Lessons learned from Brown Dwarfs

Guest Lectures: TBD

Spring Break

Part 3 (*Exoplanet Characterization*)

Planetary Structure and Composition

Transits: Secondary Eclipses & Irradiated Atmospheres

Transits: Spectroscopy

Direct Imaging: Giant Planet / Brown dwarf Evolution

Direct Imaging: Giant Planet / Brown dwarf Spectroscopy

Special topics (future instruments, exo-comets, moons, rings, etc.)

Guest Lectures: TBD

Absence and Class Participation Policy

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

Required Texts or Readings

Several books will be on reserve in the LPL Library. A reading list will be updated through the semester.

Materials can be found on the course webpage: <https://www.lpl.arizona.edu/~barman/ptys568/ptys568.html>

Assignments and Examinations: Schedule/Due Dates

Projects: There will be two to three projects involving exoplanet data and/or numerical modeling. Basic coding skills are required (you will not need to be an expert programmer but some previous experience will be helpful). Students may discuss any aspect of the projects with other classmates, but the final product should be the result of individual work. A written summary of the project will be submitted along with all source code.

Class participation and presentations: Students will present papers relevant to the current lectures (approved ahead of time) to the class. Students will be graded on their presentations as well as the questions and discussions they raise during other student presentations (or guest lectures). You will be called upon to ask a question at the end of guest lectures and student presentations.

Final Examination: None

Grading Scale and Policies

50% of your grade will be based presentations/participation and 50% on several projects.

The grading scale will be as follows:

90 – 100	A
80 – 89.9	B
65 – 79.9	C
50 – 64.9	D
< 50	E

Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

Accessibility and Accommodations

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit <http://drc.arizona.edu>.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate. Be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

UA Nondiscrimination and Anti-harassment Policy

The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Additional Resources for Students

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies> Student Assistance and Advocacy information is available at <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

Confidentiality of Student Records

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

Subject to Change Statement

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.