

Class Meetings: M/W 10:00am-11:30am, Campbell 501B

Instructor: Courtney Dressing

Assistant Professor of Astronomy

Office: Campbell 605E

Email: dressing@berkeley.edu

Website: w.astro.berkeley.edu/~dressing/

Office Hours: W 11:30am – 12:30pm or by appointment, Campbell 605E

Class Website: w.astro.berkeley.edu/~dressing/C249

Piazza Group: piazza.com/berkeley/fall2018/astronc249

This course introduces graduate students and advanced undergraduates to the dynamic field of planetary systems. We will cover the instruments and techniques used to detect and characterize planets, planet formation, interior structures of planets, planetary atmospheres, habitability, and biosignatures. As part of the course, students will discuss current journal articles and conduct original research. Course participants are encouraged (but not required) to attend the related astronomy talks listed in the syllabus.

Course Objectives:

- Students will become familiar with the methods used to detect, characterize, and model planetary systems and the current status of planetary research.
- Students will learn how to critically assess journal articles, synthesize material from multiple sources, and conduct independent research projects.
- Students will develop the technical skills required to analyze data, reproduce published results, and conduct their own investigations.

Format: Lecture, group discussion, student presentations, problem sets, & final project

Prerequisites: Familiarity with physics & astronomy at the undergraduate level. This course is designed for first and second year graduate students, but is open to advanced undergraduates with a keen interest in planets. Undergraduate students will have individual meetings with the instructor prior to the add/drop deadline to discuss their performance during the first few weeks of the course.

Required Reading

Handbook of Exoplanets edited by H. Deeg & J. Belmonte (2018) ISBN 978-3-319-55332-0 (very expensive, but chapters are freely available [at springer.com via Berkeley's subscription \(Links to an external site.\)](#); links to individual chapters are [here](#))
Exoplanets edited by S. Seager (2010) ISBN 978-0-8165-2945-1 (\$30; free electronic version also [available via Berkeley library \(Links to an external site.\)](#))
Selected journal articles (freely available via UC journal subscriptions and posted in our class ADS library at <https://tinyurl.com/C249-fall2018> (Links to an external site.)) (Links to an external site.)

Additional References:

Astrophysics of Planet Formation by P. Armitage (2010) ISBN 978-1-107-65308-5 (\$40)

Planetary Sciences by de Pater and Lissauer 2nd Ed (2015) ISBN-13: 978-1107091610 (\$40-\$100)

The Exoplanet Handbook by M. Perryman (2014) ISBN 0521765595 (\$35)

Course Requirements & Grading Plan:

Class Participation	5%
Programming Exercises	5%
Journal Club	15%
Final Project	30%
Problem Sets	45%

Late work will be accepted only in extraordinary circumstances. Assignments should be submitted via email or in advance if students will be traveling on the due date.

Programming Exercises: These assignments will help students become familiar with the software packages used during the class. Students are encouraged to begin working on assignments well before the deadline to ensure that any required software packages are compatible with their operating systems. I will aim to pick well-tested packages, but several of the programs used in the course are actively evolving.

Journal Club: A major component of this course is reading and discussing journal articles. Each student will lead the discussion of 1-3 articles during the semester and ask questions when other students present. In order to facilitate class discussion, students will be required to submit 2 questions in advance on days when they are not leading the discussion.

Problem Sets: Course problem sets will be due roughly every two weeks and will usually require programming. When possible, students will work with real data sets.

Final Project: Near the end of the course, each student will give a conference-style oral presentation addressing an active area of research in exoplanets. Students will also submit final reports at the end of the course and meet several intermediate deadlines.

Collaboration Policy: Students are welcome (and encouraged!) to discuss class topics and assignments with other astronomers, but students are required to write their own solutions, presentations, and papers. Please list collaborators when submitting class assignments.

Accommodations for Students with Disabilities: Please inform me as early as possible if you require particular accommodations so that I can make the necessary arrangements. If you have not already obtained a Letter of Accommodation, please visit the Disabled Students Program (<http://dsp.berkeley.edu/students>) [Links to an external site.](#) to request a letter.