The Planets, ASTRON W12, 2020*

Three (3) semester credits

Course Description

A tour of the mysteries and inner workings of our solar system. What are planets made of? Why do they orbit the sun the way they do? How do planets form? Why do some bizarre moons have oceans, volcanoes, and ice floes? What makes the Earth hospitable for life? Is the Earth a common type of planet or some cosmic quirk? This course will introduce basic physics, chemistry, and math to understand planets, moons, rings, comets, asteroids, atmospheres, and oceans.

Understanding other worlds will help us save our own planet and help us understand our place in the universe.

Prerequisites

There are no prior course requirements.

Course Objectives

After successfully completing this course, you will be able to

- Describe the contents of our Solar System, including planets, major moons, asteroids, and comets, and identify their basic interior constitutions
- Explain the reasons for phases of the moon, solar and lunar eclipses, and the origin of the motion of the sun, moon, stars, and planets in the night sky
- Identify the ideas behind basic equations of forces, energy, momentum, and gravity
- Reflect upon the nature of light, wavelengths, frequencies, and how light is generated and absorbed by atoms and molecules
- Explain the structure of Jupiter and Saturn and their rings and moons, especially the four large moons of Jupiter and the largest moon of Saturn
- Compare the four rocky planets and describe their interior structure, plate tectonics, volcanism, and weathering

- Describe the structure of planet atmospheres and explain the greenhouse effect and its relation to global warming
- Explain asteroids, comets, and the reason for Pluto's demotion
- Describe the nature of the Sun, its energy generation, and its magnetic spots
- Recognize the form and detection of planetary systems around other stars
- Define the manner of life on Earth and the possibility of life on other worlds

Instructor Information, Contact, Office Hours, & Communication

Course Instructor

Prof. Burkhard Militzer

Graduate Student Instructors (GSIs)

While the instructor will interact with the whole class and will oversee all activities and grading, as well as being available to resolve any issues that may arise, **the GSIs will be your main point of contact.** Your GSIs are responsible for assisting you directly with your questions about assignments and course requirements, as outlined in the Assignments and Calendar. The GSIs will also facilitate ongoing discussion and interaction with you on major topics in each module.

Office Hours

The GSIs will offer virtual office hours at set times to communicate in real time with students. These sessions are logged, so if you cannot attend the office hours, you can review the conversation later. You can access the office hours through the left navigation in bCourses.

Office hour attendance is optional but students may receive an extra 20 points (57% of one week's discussion grade) for making a meaningful contribution to the conversation in any office hour during weeks 1 through 3. The GSI decides what constitutes a meaningful contribution. During weeks 4-7, students may receive a second set of 20 points for such a contribution.

For an overview of office hours' times, visit the Office Hours link in the left-hand course navigation menu.

Course Mail

Make sure to check the Course Mail for messages from the instructor. You can access course email within the learning management system by clicking on the Inbox link in global navigation (on the far left). You can also choose to have your course mail forwarded to your personal email account or your cell phone through your bCourses account settings.

Question & Answer Forum

Please use this forum to post questions about the course material, assignments, the learning management system or online homework. **The instructor/GSIs will monitor this forum,** but you should also feel free to post answers to help other students. This helps to create a general FAQ so that all students in the course may benefit from the exchange.

One-on-One Conferencing

You can also arrange for a one-on-one conference with your GSI. These conferences can occur through Zoom, the online office hours tool, or over the phone. See the Support page about contact information.

Course Materials and Technical Requirements

Textbook and Required Online Homework

The Cosmic Perspective: The Solar System, 9th Edition

Jeffrey O. Bennett, Megan O. Donahue, Nicholas Schneider, Mark Voit

Published by Pearson

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Published Date: Feb 4, 2019

Package ISBN-13: 978-0-13-499077-4

VERY IMPORTANT: Before making any purchase, please read Textbook and Online Homework for W12 "The Planets" that describes

various options to purchase our textbook and to register with the Modified Mastering Astronomy homework system, *which is required for this course.*

Technical Requirements

This course is built on a learning management system called Canvas and you will need to meet these computer specifications to participate within this online platform.

Optional

Canvas allows you to record audio or video files of yourself and upload them in the course. Although doing so is not required for any of the activities, using these features will enhance your engagement in the course. If you would like to use these features, you will need to have a webcam and a microphone installed on your computer.

Technical Support

If you are having technical difficulties please alert one of the GSIs immediately. However, understand that neither the GSIs, nor the professor can assist you with technical problems. You must call or email tech support and make sure you resolve any issues immediately.

In your course, click on the "Help" button on the bottom left of the global navigation menu. Be sure to document (save emails and transaction numbers) for all interactions with tech support.
Extensions and late submissions will not be accepted due to "technical difficulties."

Learning Activities

Note that you won't be able to access your course material until you read and make your pledge to Academic Integrity in bCourses.

Course Activities

You are expected to fully participate in all the course activities described here.

1. Read the assigned textbook pages
2. Watch the lecture presentations
3. Participate in weekly online discussions

4. Complete weekly homework assignments
5. Read web-based announcements and postings assigned during the course
6. Complete the midterm exam and final exam

Sections

For grading purposes, each of you has been assigned to one of the course GSIs and placed within his/her section. Your particular GSI will grade all of your work, as well as that of your section-mates, and engage with you in the course discussions. You can see whose section you've been placed in by exploring the "Section" column within the "People" page or by examining your discussion group's title, which includes your GSI's name.

Modules

A module is a grouping of topics related to one area of study, typically with readings, lectures, and various kinds of assignments. Each module contains a list of Learning Outcomes for the module. Your assignments reflect the learning activities to perform to reach those outcomes. For an at-a-glance view of due dates and projects, refer to the course **Calendar**.

Reading Assignments

Each module includes specific reading assignments from the textbook.

Multimedia Lectures

Recorded lectures support your readings and assignments but also contain additional material that may be included in the exams. Each lecture has been broken into sections. You are expected to take notes while viewing the lectures as you would in a regular classroom.

Demonstration Videos

We have made an attempt to illustrate important concepts through demonstrative videos and animations. While most are included directly within the lecture, we have filmed some specific demonstrations that will be watched separately. These will be listed on the lecture pages.

Homework Assignments

In every module, you will find assigned homework at Modified Mastering Astronomy. You must login to Modified Mastering Astronomy to complete the weekly homework assignments.

Additionally, there are written assignments in Modules 2, 5, and 7. You will submit your written assignments to the appropriate drop boxes.

Discussion Forums

Weekly Discussion Forums

Each module contains a group discussion in which we ask you to write reflectively and critically about the discussion topic. Your posts and responses are considered your class participation and represent a unique opportunity for you to exchange views with your peers, share experiences and resources, and check your understanding of the course material.

Discussion groups have been pre-assigned. When you navigate to a discussion forum, you will automatically be taken to your group's space within the course. When finished with the discussion, you will need to navigate from your group space back to the main course space.

While the discussion forums are asynchronous (no exchange of postings is expected in real time), you will be expected to submit one initial, longer posting by 5:00 pm Wednesday (PDT) and to respond to two or more other students' postings by 5:00 pm Friday. However, a continued participation throughout the remainder of the week is highly encouraged and your overall engagement will matter for your discussion grade. **Note that during the last week of the course, these deadlines will be different.** See the instructions within each discussion forum for further guidelines.

Questions and Answers Forum

Please use this forum to post questions to everyone about the course or topics being studied. The questions will be answered in the forum by the course instructor or GSIs. This way, all students benefit from seeing the answers. This is the preferred place to ask and get answers to questions that are likely to be of general interest.

Midterm and Final Exams

There will be two midterms and one final exam to be taken in Modules 4, 6, and 8, respectively. All three exams will be taken online in bCourses. See the Calendar for the dates and times. **All exams have a time limit and must be started within 15 minutes of the specified start time (PDT).** If the exam time is after hours in your time zone or if you have a direct conflict with another course, you may be allowed to take the exam later if you seek permission a week in advance. The exam will be a combination of multiple-choice and essay questions covering topics from course readings, homework, and lectures including the guest lectures.

While the exam is considered an open-book examination, it cannot be taken collaboratively with other students. The learning management system keeps detailed records of logins and submissions. Please review the ethics guideline for online courses provided at the beginning of this class and the UC Berkeley code of conduct.

If you have a Letter of Accommodation at UC Berkeley, confirm with your GSI that it has been received and accommodations have been made. When you start the exam, check the timer when you open it to confirm you have the correct time accommodation.

Discussion Participation Criteria

Initial Post

- Initial posts are worth up to 20 points.
- Post your initial response to the discussion board by 5 p.m. Wednesday (PDT).
- Your initial posts should feature an original, thoughtful response to the discussion prompt, drawing on the concepts and terminology you've learned in this course as well as from outside research and investigations.
- Please begin your post with a short title sentence/paragraph so your classmates can, at a glance, see what you discussed.
- For a top-scored post, suggested length is roughly 350 words, minimum. See the rubric below for more information on discussion score.

- We encourage you to cite outside sources to support your arguments. Please mark such citations clearly and use the post field's link function to reference online sources.
- Note that you will be unable to view your group members' posts until you've created an initial post of your own.

To post, follow these steps:

1. In the text field marked "Reply" located beneath the discussion prompt, type your answers/reflections.
2. To include an image within your post, use the post field's "Embed Image" feature. You can embed multiple images within a post. (For discussion about Mars in Module 5, it is important that your images appear with good resolution and are displayed directly rather than as a link that one needs to click.)
3. To attach a file to your post, click the paperclip icon and "Attach" in the post's lower-left corner.
   - You can only attach one file to a post. To get around this and attach multiple files, finalize your initial post as directed below, then create a reply post to that post and attach another file within it. Repeat this process for each additional attached file.
4. Click the "Post Reply" button to finalize and submit your post.

Reply Posts

- Your cumulative reply participation is worth up to 15 points per Module.
- Read your fellow group members' posts and respond to at least two by 5 p.m. Friday (PDT). Ask your fellow students questions, point out new possibilities and don't hesitate to go beyond the original discussion assignment. Try to initiate engaging conversations as you do in real life.
- Though only two reply posts are formally required, you are highly encouraged to actively contribute to the discussion up until 5 p.m. Sunday (PDT).
- Reply posts should feature a thoughtful continuation of the discussion: "I agree" or "good point" are not sufficient responses without further, substantial elaboration.
- For a top-scored reply post, good ideas are most important. As a rough recommendation, a length of 150-250 words would be appreciated.

To reply, follow these steps:

1. Click the Reply link at the bottom of the post you wish to reply to.
2. Type your answers/reflections in the text field.
3. Click the "Post Reply" button to finalize and submit your reply post.

Response Appreciated

For our interactive discussions, we need a straightforward way to ask for a response when we reply to someone's post. So, your GSIs and professor might conclude a reply post with the capitalized words, "RESPONSE APPRECIATED." *You* may also use this tool when replying to your fellow classmates' posts.

Until the Sunday 5 p.m. deadline, please check regularly if someone has replied to you with "RESPONSE APPRECIATED"; if someone has, we expect that you reply within 24-36 hours.

Rubric for Evaluating and Grading Discussion Posts

Your discussion assignments will be graded on the satisfaction of a few minimal requirements (see below) as well as on your overall participation within the discussion (i.e. completing the minimal requirements will not ensure full credit). The suggestions below offer advice on how to ensure the highest possible score while the rubric further down gives you an idea of how your participation will be evaluated.

Formal requirements:

- Initial responses posted by 5 p.m. Wednesday (PDT).
- A minimum of two peer responses posted by 5 p.m. Friday (PDT).
- Check until 5 p.m. Sunday (PDT) for "RESPONSE APPRECIATED" replies to your posts and reply accordingly.
- Requirements for full credit for reply posts:
- Participate early and often.
- Check, and contribute to, the discussion forum on at least three separate occasions throughout the week.
- Engage beyond the minimum of two reply posts requirement.
- Engage beyond the Friday reply post deadline.

- Engage others with the "RESPONSE APPRECIATED" option.
- Raise new topics others may find interesting.
- Share resources you've found through your own interests, explorations and research (e.g. articles, podcasts, websites, etc.).

Your discussion assignments will be graded for accuracy and for quality of response. The rubric below gives you an idea of levels of competence.

Criterion	**Poor**	**Needs Improvement**	**Meets Expectations**	**Exceptional**
Content	Poor writing style with little or no specific details, no evidence of having studied the material, and/or off topic.	Adequately written; some points elaborated but with minimal use of concepts from the material.	Well written, most points elaborated with clear and detailed information that supports thoughts and ideas and uses concepts from the material.	Well written, fully elaborates points. Clear and detailed information supports thoughts and ideas and shows full acquisition of concepts from the material.
Organization and Mechanics	Little or no structure present. Grammatical errors interfere with comprehension.	Organization present but awkward. Some grammatical errors present.	Good organization with few statements out of place. Minor grammatical errors.	Clearly organized and remains focused. Few or no grammatical errors.
Participation	Minimal posts in number or length. Posts show little or no	Posts address the topic but consist mostly of a rote repetition of the study materials.	Posts address the topic with reflection. Many responses build on	Posts show a genuine interest in contributing to the overall

	reflection on the topics or previous posts.	Little or no reflection on previous posts.	previous posts.	life of the forum.

Table 1: Criteria for Discussion Assignments

Grading and Course Policies

Your final course grade will be calculated as follows:

Category	Percentage of Grade
Mastering Astronomy and Written Homework	30%
Discussion Assignments	25%
Midterm Exam 1	15%
Midterm Exam 2	15%
Final Exam	15%

Table 2: Final Grade Percentages

Note: You must receive a score of **at least 50% in each of the five components** in order to pass the course.

It is important to note that not all components are graded online and included in the online course grade book. Because of this, the online course grade book will not display your overall course grade at any given time or your final grade. It should simply be used to assess your performance on the components that are included within it: the discussions, written assignments, and exams. Your final letter grade will be mailed to you by the registrar's office.

Course Policies

Promptness

All assignments are due by their listed due date and time (see the **Calendar**), except for the last module when some earlier times are indicated. All due dates and times are given in Pacific Daylight Time (PDT). We will subtract 20% for every day that an assignment is late. **No late assignments will be accepted during the last week of this course**, and any un-submitted assignments will receive zero points. You will receive zero points for any late posts/responses to the Discussions Forum. You must take the midterm within the allowed 24-hour period or you will receive zero points.

Further, each online activity must be submitted through the course website by the due date. Fax or mail submission will not be accepted. Students who wait until the final hours prior to a submission deadline risk having problems with their ISP, hardware, software, or various other site access difficulties. Therefore, it is advisable to submit assignments and tests through the course website early. The multiple days allowed for submission are to accommodate the busy schedules of working professionals, not to accommodate procrastination. Students should plan accordingly and get into the habit of checking the course website several times each week, and submitting and posting early.

Honor Code

The student community at UC Berkeley has adopted the following Honor Code: "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others." The expectation is that you will adhere to this code.

Collaboration and Independence

Reviewing lecture and reading materials and studying for exams can be enjoyable and enriching things to do with fellow students. This is recommended. However, unless otherwise instructed, homework assignments and the online exam are to be completed independently and materials submitted as homework should be the result of one’s own independent work.

Cheating

A good lifetime strategy is always to act in such a way that no one would ever imagine that you would even consider cheating. Anyone caught cheating on a quiz or exam in this course will receive a failing grade in the course and will also be reported to the University Center for Student Conduct. Exams are to be completed without the assistance of other people, and without reference to texts, notes, and other materials. The expectation is that you will be honest in the taking of exams.

Plagiarism

To copy text or ideas from another source without appropriate reference is plagiarism and will result in a failing grade for your assignment and usually further disciplinary action. For additional information on plagiarism and how to avoid it, explore the resources linked below:

UC Berkeley Library Citation Page, Plagiarism Section

GSI Guide for Preventing Plagiarism

Academic Integrity and Ethics

Cheating on exams and plagiarism are two common examples of dishonest, unethical behavior. Honesty and integrity are of great importance in all facets of life. They help to build a sense of self-confidence, and are key to building trust within relationships, whether personal or professional. There is no tolerance for dishonesty in the academic world, for it undermines what we are dedicated to doing—furthering knowledge for the benefit of humanity.

Incomplete Course Grade

Students who have substantially completed the course but for serious extenuating circumstances, are unable to complete the final exam, may request an Incomplete grade. This request must be submitted in writing or by email to the GSI and course instructor. You must provide verifiable documentation for the seriousness of the extenuating circumstances. According to the policy of the college, Incomplete grades must be made up within the first three weeks of the next semester.

Students with Disabilities

If you require course accommodations due to a physical, emotional, or learning disability, contact UC Berkeley's Disabled Students' Program (DSP). Notify the instructor and GSI through course email of the accommodations you would like to use.

UC Berkeley is committed to providing robust educational experiences for all learners. With this goal in mind, we have activated the ALLY tool for this course. You will now be able to download content in a format that best fits your learning preference. PDF, HTML, EPUB, and MP3 are now available for most content items. For more information visit the alternative formats link or watch the video entitled, "Ally in bCourses."

End of Course Evaluation

Before your course ends, please take a few minutes to participate in the course evaluation to share your opinions about the course. The evaluation does not request any personal information, and your responses will remain strictly confidential. A link to the evaluation (in the left-hand navigation menu) will be made available via bCourses. You will also be emailed a link to the course evaluation.

**This syllabus is subject to change.*